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Number 21

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THE Strikingly Beautiful new mode of *exclusive* body fittings, has been made possible solely by the designing and manufacturing talent, which Ternstedt has carefully selected and trained to meet the exacting demands of motor car interior decoration.
Harmonized Interior Fittings by TERNSTEDT *Will Be a Powerful Sales Factor of Motor Cars in 1928*
TERNSTEDT
Designers and Makers of the World's Finest Body Fittings
DETROIT U. S. A.
ARTIST ENGINEERS
DESIGNERS
MODELERS
DIE CHASERS

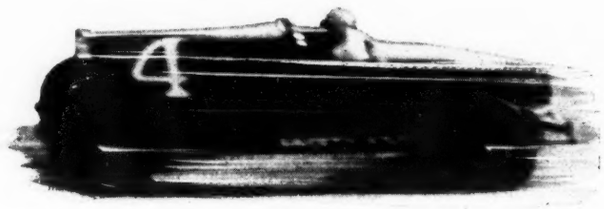
Entered as second-class matter Oct. 1, 1925, at the post office at Philadelphia, Pa., under the Act of March 3, 1879

Federal Mogul again shares honors with Stutz!

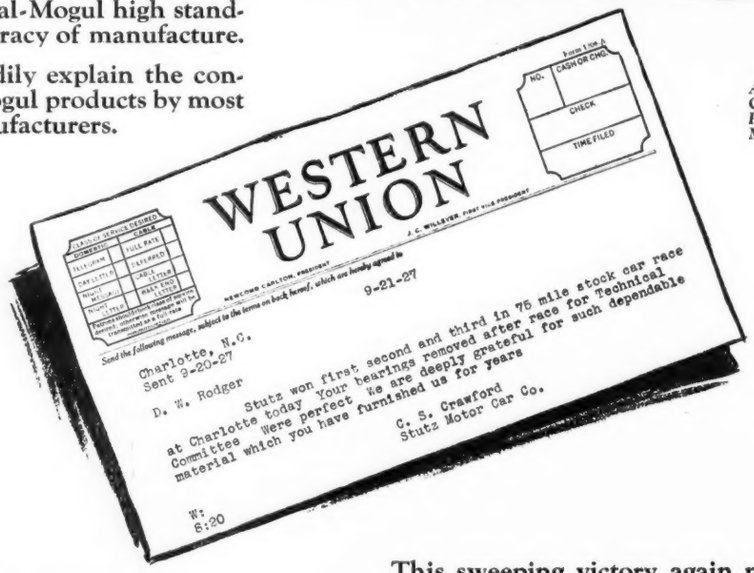
Flashing to a phenomenal finish of first, second and third place, three Stutz Black Hawk stock cars gave a practical demonstration of reliability at the 150-mile free-for-all stock car race at Atlantic City on September 5th.

It is significant that Federal-Mogul Bearings played such an important part in this achievement. Their ability to withstand such gruelling treatment without showing signs of wear is due entirely to Federal-Mogul high standards of quality and accuracy of manufacture.

Records of this sort readily explain the continued use of Federal-Mogul products by most leading automotive manufacturers.



At the finish at Atlantic City. Average 96.3 M. P. H. Fastest lap 105 M. P. H.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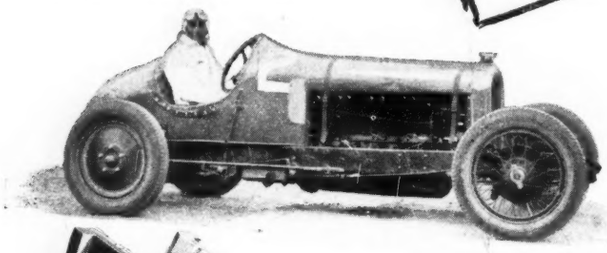
Charlotte, N.C.
Sent 9-20-27
D. W. Rodger
Stutz won first second and third in 75 mile stock car race at Charlotte today Your bearings removed after race for Technical Committee were perfect We are deeply grateful for such dependable material which you have furnished us for years
C. S. Crawford
Stutz Motor Car Co.
W:
6:20

At Charlotte, N. C., on September 20th, Stutz repeated, winning first, second and third places.

In the free-for-all climb at Pike's Peak on Labor Day, Glen Shultz, driving his Stutz Eight special, repeated his success of a year ago by flashing up the twelve and one-half mile mountain course in 18 minutes, 23.1 seconds.



This sweeping victory again proves Federal-Mogul superiority. Mr. Chas. S. Crawford, chief engineer of Stutz, says in part:

"Prior to the race, each car had 1000 miles of high speed work on the Indianapolis Speedway. They were then driven overland to Atlantic City, where they were driven time and again in trials prior to the race up to 105 miles per hour. All of the cars averaged in excess of 100 miles per hour for periods of even longer than the race.

"From the time these engines were built in the production line until they were torn down for inspection by the Technical Committee after the race, they never had as much as a wrench put on them, much less any inspection being made of the bearings.

"The nine Federal-Mogul bearings carrying the crankshaft were in wonderful shape; as a matter of fact, they were just as good as new.

"I am happy to say that these bearings are one part of the assembly which we never have to worry about."

The Complete Federal-Mogul Line Includes:

Bronze-Back, Babbitt-Lined Bearings; Die-Cast Babbitt Bearings and Bushings; Bronze Bushings; Bronze Washers; Bronze Castings; Babbitt Metals; Bronze Cored and Solid Bars.

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Mogul FEDERAL

FEDERAL-MOGUL CORPORATION, DETROIT, MICHIGAN

AUTOMOTIVE INDUSTRIES
VOLUME 57 *Philadelphia, Saturday, November 19, 1927* NUMBER 21

The Factory Can Eliminate the Used-Car Problem

Less emphasis on gross volume and more consideration of the dealer organization would rid industry of costly and annoying "Boll Weevil."

By Edwin B. Jackson

IT is reported that one of the most terse and rapid sales of motor cars at retail occurred in Chicago a number of years ago.

Two successful merchants were lunching together at the Blackstone Hotel. One of them, who had seen a new model motor car being displayed on Michigan Avenue, expressed the thought that he would join his friend in the purchase of two of this particular make, if, on examination, the car was mutually satisfactory. The car listed at $5,500.

That afternoon the friend dropped into the show room. While he was examining the car a salesman approached and this is the reputed conversation.

Customer: "Ten for two."

Salesman: "You bought something."

At about the same time one of the world's leading financiers was spending a valuable half-hour of his time in the back seat of a limousine in a Broadway salesroom in New York, trying to convince a salesman that he, on account of his position, should have a 10 per cent discount.

He also bought, *but he paid list price.*

The first of these two companies has long since gone down to defeat and bankruptcy, the second still is a leading and most respected manufacturer of motor vehicles. One had no list price policy, the other a very definite one.

By the same token, unless the motor car industry as a whole establishes a definite and well-understood policy in handling the used-car problem, it will never maintain its proper position among the great industries of our country.

I once heard a so-called captain of industry say that a company's policies should be subject to change daily. He laid far too much emphasis on the value of opportunism. A public man may become spectacular if, to suit a situation, he is a Protestant on Monday, a Roman Catholic on Tuesday, a Democrat on Wednesday, a Republican on Thursday, gives a temperance lecture on Friday and gets drunk on Saturday night. He would be spectacular, but devoid of public respect.

For years I have read volumes concerning the used-car problem, so I presume such a thing really does exist. It is to be taken for granted that the purchase and sale of used cars is a necessary part of any new car sales establishment. If there be a used-car problem, let's analyze it as a doctor would diagnose a case.

First, being familiar

THE writer has spent a good many years in the various activities of the motor car industry and bows to the many captains who have marshalled the industry to its present position. But from his experience he feels that he may be instrumental in offering some suggestions which may assist in scraping the barnacles off this majestic ship of accomplishment so that it may more successfully maintain its schedule of performance. This article, therefore, is offered for careful criticism and with due apologies.

—EDWIN B. JACKSON.

with various diseases and knowing the seriousness of the results if not checked, the physician would analyze the condition of the patient, locate the cause of the trouble and apply the necessary remedy.

Is every motor car dealer afflicted with this used-car problem disease? Upon examination we find that the dealer of average intelligence, who is not expected to force cars upon his public, is in a healthy condition and has no used-car problem.

Let's then examine those who are afflicted and we find that the most of this trouble is rather deeply seated. In almost every case it starts back at the factory.

Of course, some manufacturers may throw up their hands and disclaim any responsibility. Just the same, most makers, as well as most dealers, know that much of the real responsibility is properly laid at the former's door.

An examination of the operations of the manufacturer permits us to locate the cause and to study the entire course of the disease from its inception through to its full development.

Probably this is what we will find. One day the engineering department comes in with improvements. Probably the car that would only do 72 miles an hour now, with new changes, will do 73. This is the introduction of what may be called the increased production bug. The manufacturer is restless, he can't sleep; he gets back to the factory bright and early and calls in the "yes" chorus. Everything looks rosy for some reason or other. The smoke that day seems to go out of the chimney faster, doors open and shut with a snap, even the office boy seems to be in a hurry. Poor fellow, he is in a bad way.

Then the purchasing executives are given the new schedule and they start burning the midnight oil. Vendors with blanched faces who have been through the wringer leave the plant with signed contracts. The advertising men are called in and they get the spirit. Those dealers who have not been inoculated are brought in for their particular treatment. Everything goes with a bang. Then things start to happen.

After production is in shipment you find that your competitor has induced his car to go 74 miles an hour.

Then new plans must be tried. New paint schemes, new advertising copy, extravagant statements, parades, brass bands, window posters. Pressure, pressure, and the dealers' bins are jammed. Even then the patient is getting worse.

There is a sober, quiet meeting in the front office and, after much hesitation, the management reluctantly opens the closet and lets out Mr. Boll Weevil, otherwise known as trading allowance, and he starts out to destroy all vestiges of good business practice throughout the field.

Let's examine this Boll Weevil. Did it ever occur to you that he was not really honest? He only operates when a customer has a used car to trade. He allows the unsuspecting cash customer to pay full list price. What a weak policy for a strong industry!

He also differs from his brother, the cotton Boll Weevil.

The Government has spent many millions in an attempt to destroy this cotton pest, but the motor car manufacturer is more considerate of his Boll Weevil; he spends millions annually to keep him alive.

Over-production brings in its trail many other disturbing factors which have no proper place in any well-organized business. Factory production goes in fits and starts. The expensive practice of hiring and firing personnel takes its toll. Parts and accessory makers are called upon to share the load by accepting cancellations. The entire budget of operating expense is thrown out of gear.

Something Out of Gear

The dealer organization is called upon to tear down and destroy most of its strong policies. Everyone in the dealer's establishment knows that something is out of gear. There is a "nigger in the wood pile"; they know the Boll Weevil is at work.

Unbusinesslike practices are adopted. Fictitious overheads are created and if the dealer is able to weather the gale, he wakens to find that all of his profits are tied up in used cars of questionable value. He ceases to be a good merchant and finds himself in control of a three-ring circus. He has even been known to so lose his judgment as to advertise for used cars—he tells the public he needs them! This dealer is indeed in a bad way.

If the practice of over-production continues, then must follow a material increase in dealer discounts and a resultant higher list. Then must, of course, come the cash discount for the retail purchaser who has no trade-in. Then the finance companies will want at least 50 per cent down instead of

EDWIN B. JACKSON, author of the accompanying article, is a pioneer automotive salesman and a recognized authority on automotive marketing methods.

His first connection with the industry was as manager of John Wanamaker's automobile department in New York City, marketing the Ford in its early history. Later he spent nine years with the Packard organization in New York City and Philadelphia, resigning as president of the Packard Co. of New York to accept the position of vice-president in charge of sales of the Willys-Overland Co., which he held for five years.

Edwin B. Jackson

33 1-3 per cent in order that their equity may be properly cared for and the ultimate result would probably be a depreciation in market value of motor car shares.

But the car manufacturer may say, "I cannot afford to hold down my production unless my competitor does the same thing."

Let's analyze this statement. First, is a dealer organization a necessary adjunct to a manufacturing establishment? In other words, when the manufacturer is giving his problems the consideration which they deserve, should he not feel that the dealer is sitting in with him on the conference and is entitled to some say as to the policies established? Of course, he can do without the dealer provided he is willing to finance his own branch organization, but it is my experience that the manufacturer has no real desire to make this expenditure if it can be avoided. His policy should take into consideration its effect upon the dealer organization. His stockholders should also be thought of when policies are established.

Production or Strength?

Is it better for the manufacturer to be able to say to his competitor, "You see I passed you in production," or to say to his stockholders, "You now have a strong, well-organized business from production right down to the ultimate purchaser?"

When everything is wound up at the end of the year's operation, net profit is more important than gross volume in any business.

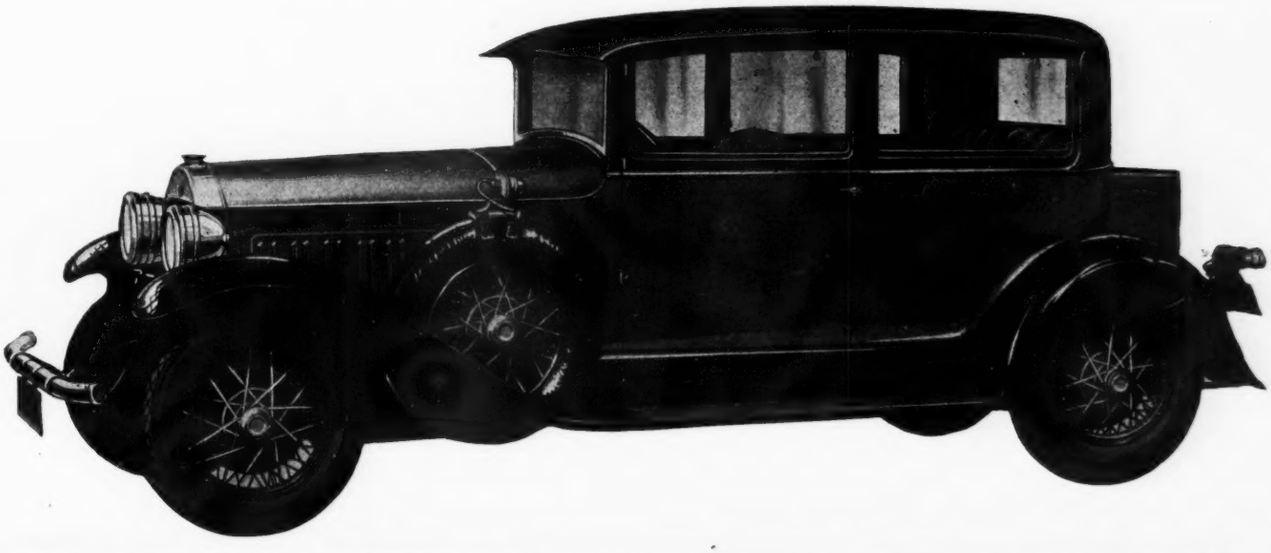
Cannot any manufacturer, without reference to his competitor, adopt wise, sane and sensible policies? Cannot he afford to lay down, carefully and intelligently, a sane production schedule which is based on a consideration of all the contributing factors governing supply and demand? Cannot he afford to keep his production on a steady, even keel and thus build up a well-organized production department? Cannot he afford to give his suppliers a steady running order for merchandise and eliminate this over-done "stop order" practice? Cannot he subscribe to the policy of helping his dealer organization not to weaken itself by building up unnatural overheads? Cannot he afford to eliminate for his company the tremendous loss incurred by dealer mortality? Cannot he indorse the establishment of a good selling organization throughout the field, an organization which will not be expected to do unbusinesslike things? Cannot he refuse to indorse the Boll Weevil of trading allowances? Cannot he afford to consider the building up of the net worth in his business? Must he wait on his competitors in order to become sane as a manufacturer and merchant?

When the public curtails its purchasing, as is always possible, he will then wish that each division of his operation had been built with strength. The gross and forced volume will be forgotten. But in a good many instances it will be too late.

The only cure for the used-car problem is an adoption, on the part of the manufacturer, of a display of thorough common sense.

The New Pierce-Arrow "81" Brougham

THIS picture of the five-passenger brougham in the Pierce-Arrow "81" line, which was described in Automotive Industries of Nov. 5, shows the changes that have been made in the exterior appearance of the new cars. The fender headlamps which have been characteristic of Pierce-Arrow in the past may still be had at extra cost. The same aluminum panel body construction that was formerly used is followed on the new cars, but the lines have been materially altered to conform more with modern practice



Bendix Brake Integral *With* Wheel Designed *for* Airplanes

Lightweight, two-shoe servo brake is incorporated in Laddon disk wheel. Four sizes in production. All parts with few exceptions made of aluminum alloy stampings.

THE Bendix Brake Co., South Bend, Ind., long ago realized the need for brakes on airplanes in order to facilitate landing, and has been working on the problem for approximately three years. About a year ago it became evident that the only practical solution lay in the development of a wheel and a brake as a unit.

At that time negotiations were started with I. M. Laddon, then of the Army Air Corps at McCook Field, who had designed and tested a new disk wheel adapted to take a brake. The negotiations were carried through, and in January, 1927, the Bendix Brake Co. took over Mr. Laddon's rights to his disk wheel and incorporated in this wheel a special lightweight, two-shoe servo brake developed from the original Perrot two-shoe brake. The time between January and October of the current year was occupied in preparing for quantity production. On Oct. 1, regular shipments began and the wheels are now being made in four sizes, viz.: 30 by 5 in., 32 by 6 in., 36 by 8 in. and 44 by 10 in., while preparations for the production of a fifth size, 54 by 12 in., for large airplanes, are under way.

In the following table are given data of dimensions, weights, capacities and test results of the different sizes, including some wheels without brakes, which are being made for special purposes. These plain wheels are claimed to be the lightest wheels for airplanes that have yet been built. In connection with the test figures the manufacturer states that they are from tests made on production wheels and are conservative:

Wheel Size	Brake	Approximate Weight Plain	Brake	Strength Radial	Size	Maximum Weight of Plane
30x5	12″	13 lb.	22 lb.	13000	4000	3500
32x6	12″	21 lb.	30 lb.	23000	5000	
36x8	12″	22 lb.	31 lb.	23000	6100	9000
44x10	20″	36 lb.	50 lb.	35000	10000	14000

We are informed that these wheels already are standard equipment on Fairchild monoplanes, are approved by the U. S. Army Air Corps, and are in production for a number of other concerns.

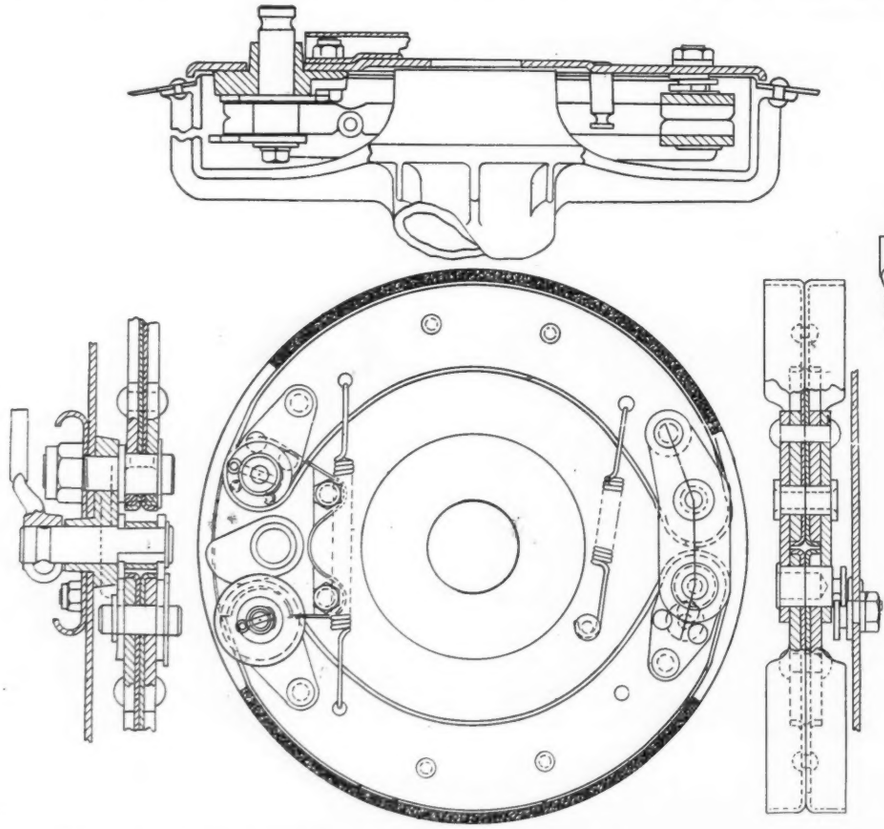


Fig. 1. Details of two-shoe brake for Bendix-Laddon airplane wheel

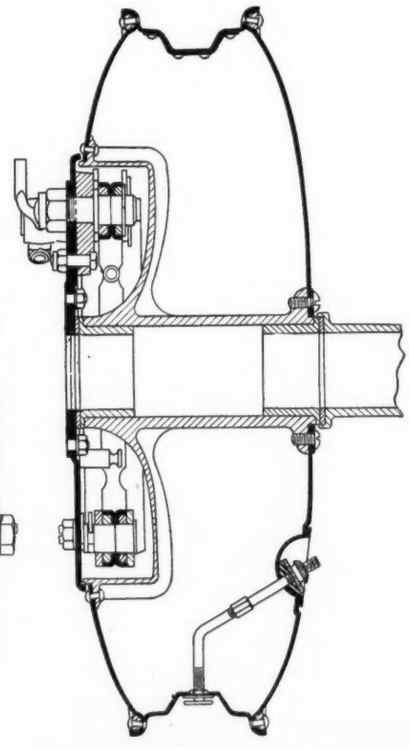


Fig. 2. Section of Bendix-Laddon airplane wheel

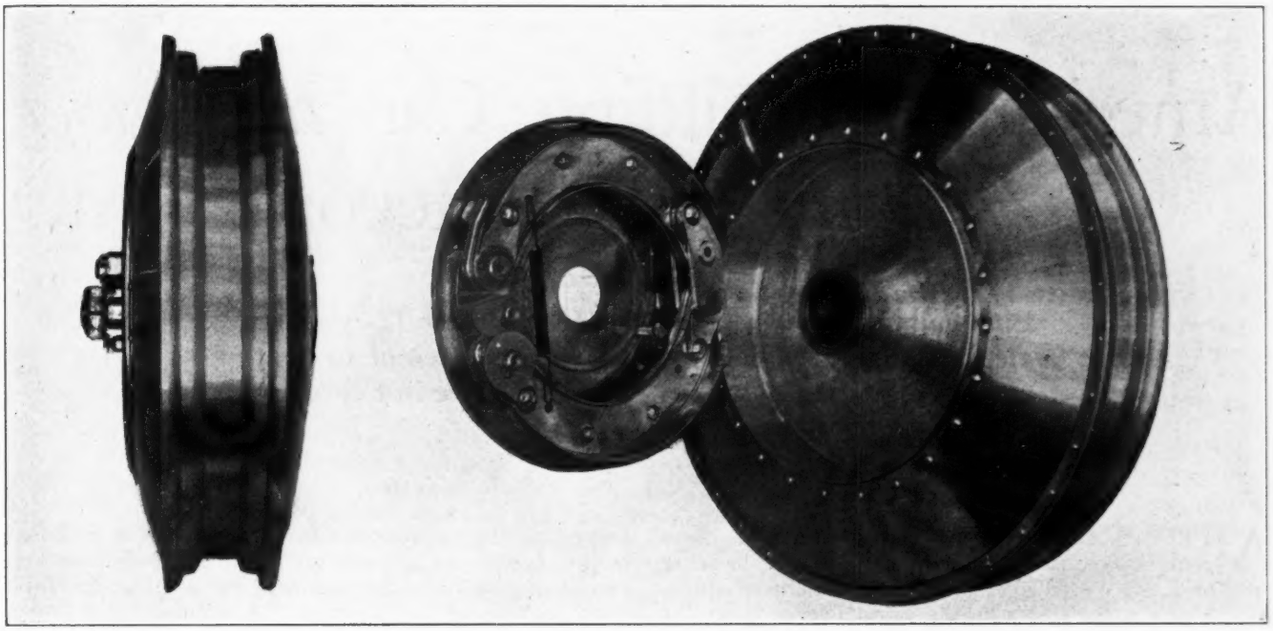


Fig. 3. Front view of wheel

Fig. 4. Brake removed from wheel

Details of the brake are shown in Fig. 1. With the exception of the anchor pin, camshaft, nuts, etc., all parts are made from high-duty aluminum alloy stampings, the brake being designed throughout to secure the maximum strength for a maximum weight. In order to obtain the maximum braking effect for a given effort on the part of the operator, roller cam followers are provided.

Fig. 2 is a sectional view and a side elevation of the assembled wheel and brake. As may be seen from the section, the hub and brake drum are integral and are a heat-treated aluminum casting, while the disks, rim and other major parts are made of rolled or drawn aluminum alloy. It will be noted that the construction is very simple. The reinforcing rings at the rim, riveted at short intervals, are said to be one of the reasons for the strength of the wheel. Braking takes place directly on the surface of the cast aluminum brake drum, experience having shown this to be quite practical provided sufficient braking surface is provided.

Fig. 3 is a front view of the 30 by 5 in. wheel and brake assembled, and makes evident the good streamline form of these wheels. Fig. 4 shows the brake removed from the wheel.

Valve Stem Design

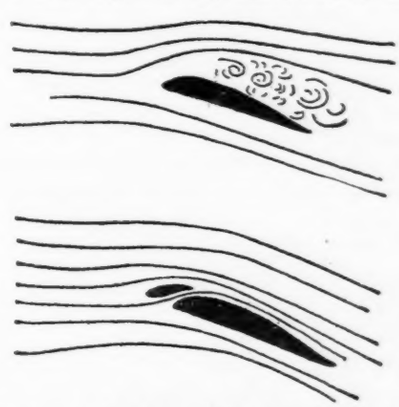
One of the problems of a wheel of this type is that relating to the valve stem, and how this has been solved may be seen by reference to Fig. 2. A short straight extension is used on the standard 45 deg. valve stem, which is used to hold in place a hemispherical cup through the medium of a soft-rubber-faced metal washer, thus providing a water-tight seal for the opening in the wheel when the tire is on.

The brake is inclosed by a cover plate, as clearly shown in Fig. 2. This cover plate is used as a brake mounting, but is not designed to take the brake torque. The latter must be taken care of by extending the axle flange to a large bolt above the operating lever, this being the brake anchor bolt. Adjustment is made from the outside, the same as in Bendix automobile brakes, and involves adjustment of the secondary shoe and a change in the position of the brake lever.

Handley-Page Slotted Wing Averts Airplane Spin

An unofficial report states that Handley-Page, working in cooperation with the National Physical Laboratory at the Royal Aircraft Factory, England, has developed his slotted wing idea of 1921 to a stage at which the risk of an airplane getting into a spin as a result of loss of flying speed is reduced to a negligible quantity.

The innovation consists of a very narrow plane located along the leading edge of each of the main top planes of a biplane, normally it lies snugly along the front of the main plane, but when the machine is stalled at such a steep angle that the normal lift is lost the extension plane moves out automatically and restores the air flow over the top surface of the main plane. Handley-Page has explained the action of this device by means of the accompanying diagrams.



Diagrams showing action of new Handley-Page anti-spin device. Upper view shows a stalled wing without a slot, the air over it being disturbed. Lower view indicates how extension plane automatically projects under such conditions and restores a smooth air flow above the main plane

American *is* Building Car *to Lower World's* Speed Record

Philadelphian designs huge racer with three 12-cylinder aircraft engines which will be used in attempt to beat present mark of 203 m.p.h. Test takes place in February

By P. M. Heldt

A SPECIAL racing car powered with three high-compression 12-cylinder aircraft engines is being built by J. M. White of 1128 Olive Street, Philadelphia, with a view to an attack on the world's speed record at Ormond Beach, Fla., next February. One of the engines is mounted in the usual position on the forward part of the frame, while the other two are located on opposite sides of the frame behind the driver's seat. In order to smoothen out the driving torque, each engine is equipped with a small flywheel, and the projecting end of the crankshaft is supported in a large ball bearing carried in a suitable mounting on the frame.

The frame is of pressed steel construction, the main channels having a depth of only 6¼ in. Between the front and rear engines there is a cross-member, from which channel section longitudinal members extend to other cross-members at the front and rear. The two forwardly extending members carry the forward engine, while each of the two rear engines is carried on one side bar and one inner longitudinal member. The frame is hung on semi-elliptic springs in front, while at the rear it rests directly on the rear axle. In fact, rear axle and frame are so combined that it is difficult to say whether some of the parts belong to one or the other.

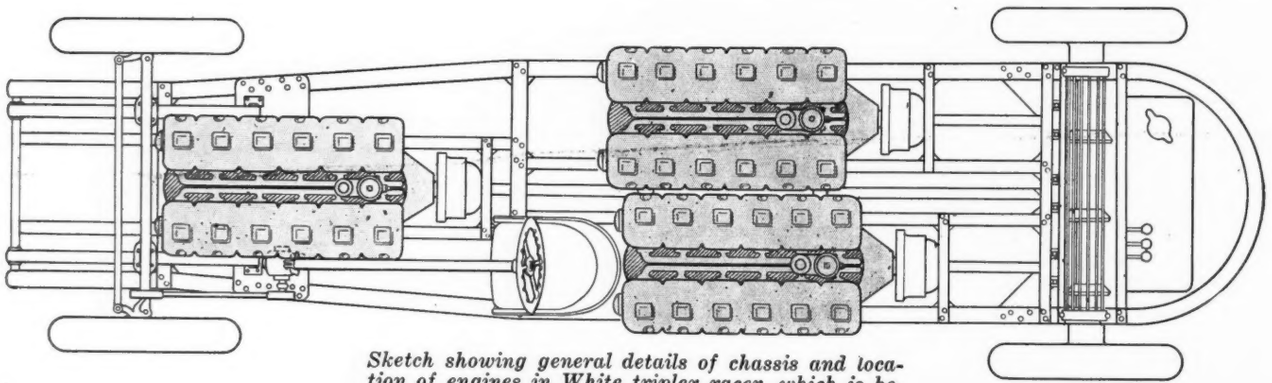
The front axle is a stock axle for heavy touring cars which is inverted in position, and the springs are underslung, being clipped to the axle with the main leaf against the spring pad. Being inverted, the axle center is naturally comparatively high, and the frame is below it and is suspended from the springs by long shackles. It is planned to provide the front axle with an under-running truss but this was not yet in position at the time of the writer's visit. As a safety measure, bow-shaped skids of flat steel are fitted under the forward portion of the frame side members. If a front tire should collapse or come off the wheel, the car will continue on the rim of the wire wheel, and if this too should break down, the frame will sag only very little more before the skid comes in contact with the ground and prevents the front spring horn from digging into the sand.

The drive from the engines to the rear axle is the simplest imaginable, no friction clutch being used, no change gear and no universal joints. Each engine drives to the axle through a separate pair of straight bevel gears, and these gears are so set that any impulses transmitted to the axle come at equal intervals.

No Differential Gear

The driving axle is a single hollow axle, no differential gear being used. At the middle of its length it has an outside diameter of 4 in., which tapers down to 3¼ in. at the ends where the wheels are fastened on, and the hole through it is 2 in. in diameter. It is supported in six anti-friction bearings, of which two are Timken roller bearings and the others Hess-Bright annular ball bearings. One of the Timkens takes the thrust from all three bevel gears.

All of the bearings are mounted in bearing brackets which are carried between cross-members of the frame. On the forward side of the axle there is a double cross-member made up of four channels, giving the effect of two letters E back to back and a short distance apart,



Sketch showing general details of chassis and location of engines in White triplex racer, which is being built for an attack on the world's speed record at Ormond Beach, Fla., in February

except that the adjacent flanges of the rear ones are omitted. The double construction is used here in order to insure stiffness in the fore-and-aft direction, which is called for by the thrust of the bevel pinions. Back of the axle there is a similar single cross-member made up of two channels one above the other. The mountings for the bearings at the ends of the axle are in the form of hollow cylinders with large radial flanges on the outside, which flanges bolt to the web of the frame side members. The Timken bearing is located at the inner, and the ball bearing at the outer end of this mounting. The mountings for the intermediate bearings are in the form of ribbed bronze castings. A considerable number of heavy bars extend between the flanges of the outer bearings, adding considerably to the rigidity of the structure.

An unusual method of mounting the bevel gears on the rear axle is used. The axle is threaded at the proper sections and the gears are screwed on. There are four keyways in the axle at each threaded portion, at equal angular distances, and by screwing the gear further onto the axle or off, the mesh of the bevel gears can be adjusted, the minimum adjustment possible being equal to one-fourth of the pitch of the thread.

The bevel gears are cut with three-pitch teeth and have a width of face of 1⅞ in. Instead of the axle being geared down, as is the case in all ordinary vehicles, it is geared up to turn faster than the engines, the pinion or driving member of each pair of gears having 27 teeth and the driven member 25. Since there are 36 explosions in two revolutions of the engines and of the driving pinions, or 720 deg., there will be one explosion to every 20 deg. of the driving pinions, which corresponds to (27/25) X 20 = 21.8 deg. motion of the rear axle.

The steering gear is a heavy type Gemmer with an 18-in. steering wheel and is mounted by means of special trunnion-type brackets on the frame at the left side of the forward engine. The length of the steering post had to be cut down somewhat to make it fit the car. In addition a special steering arm is used, of only about one-half the usual length, to get better leverage on the front wheels.

The wheels are of the Rudge-Whitworth type, of special heavy design, built by the Wire Wheel Corp. of America, and are fitted with special Firestone racing tires of 36 x 6.50 in. size, with ten plies. These tires are designed to carry an inflation pressure of 125 lb. p. sq. in. and are being specially made for the car in special molds.

The machine will be provided with a streamline body narrowed down in front to the width of an aircraft type radiator as used for 200 hp. engines. Two additional radiators of the same type will be carried at the rear. In order to break the record a speed of more than 203 m.p.h. must be made, at which speed the mile is covered in less than one-third of a minute, hence it is not necessary to carry very large radiators. The fuel tank also will be comparatively small. No starters will be carried, it being planned to start the engines by using another car as a ram.

The wheelbase of the machine is 175½ in. and the total weight will probably be between 7000 and 8000 lb. Mr. White expects to increase the power of the engines by increasing the spark advance somewhat over what is allowable for continuous running. The engines are fitted with the regular Zenith Liberty type carburetors.

Accidents in Automotive Plants Show Increase

SAFETY measures undertaken in automotive plants for the prevention of accidents scarcely held their own during 1926, since, according to studies made by the National Safety Council of the experience of 98 automotive concerns, both the frequency and severity of accidents increased slightly over those of 1925. In fact, in only one year since 1922—in 1923—was the frequency greater than in 1926, while the severity of accidents occurring last year was greater than in any other year during that period.

Against this showing for the automotive industry the accident frequency rate—which is the number of lost-time accidents per one million hours' exposure for all industries—has been reduced almost 20 per cent from 1925, while the accident severity rate—loss in working time per one thousand hours' exposure—has been reduced more than four per cent from that of 1925.

In all industries, the National Safety Council studies indicated that one out of every 13 persons was injured during 1926, while in the automotive industry alone but one out of 18 was hurt. For all industries there was one fatal injury for every 140 non-fatal, while the corresponding figure for the automotive industry was 347 non-fatal to one fatal. This indicates that although the industry's record may have lapsed a bit during 1926, it still is considerably better, on the average, than the general experience of all industries combined.

Getting more into details of the report we find that in 42 concerns manufacturing automobiles and engines, both the frequency and severity of accidents declined in 1926 from the 1925 figures while in 29 parts-making plants and in 27 machine shops both rates increased.

In the accompanying tables are given various items of comparative information which indicate the relative place of the automotive industry and its component parts in the accident picture of the country.

No. of Reports	INDUSTRY	Total No. of Employees	Total Hours Worked	No. of Lost Time Accidents				No. of Days Lost	RATES			
				Death	Permanent Disability	Temporary Disability	Total		Frequency		Severity	
									1926	1925	1926	1925
1,725	Total—16 Industries..	1,221,094	3,933,416,031	687	2,806	93,185	96,678	7,588,852	24.59	30.60	1.93	2.02
98	Automotive	183,911	426,775,094	29	484	9,554	10,067	584,167	23.60	23.42	1.37	1.06
42	Auto and Eng. Mfg...	101,634	225,914,671	18	325	5,601	5,944	373,661	26.31	34.46	1.65	1.84
29	Auto Parts.....	30,335	72,529,596	4	80	2,178	2,262	85,804	31.19	29.98	1.18	1.24
27	Machine Shops.....	51,942	128,330,827	7	79	1,775	1,861	124,702	14.50	13.44	.97	.79
12	Tire Makers.....	49,351	108,284,006	6	52	4,365	4,423	130,770	40.85	.....	1.21	.....

Motor Carrier Business *Weakened by* Unstable Franchises

Present certificates of convenience and necessity convey slender property rights and offer little protection for investors in bus-operating companies.

By E. Blythe Stason *
Professor of Law, University of Michigan

THE business of carrying persons and property by motor vehicle for the public for hire is rapidly becoming one of the billion dollar industries of the country. Yet of all the industries of its size or of anything approximating its size it rests upon the most unsatisfactory and attenuated legal foundation.

It is settled law that a common carrier has absolutely no right as against the will of the State to use the streets, highways and public places for profit. Mindful of this power to prohibit, nearly every State has prohibited the use of its highways by motor carriers. However, this mandate of prohibition has been accompanied by the proviso that if the carrier shall secure from the public utilities commission, or from some similar administrative body, a certificate of authorization, then it may operate on that portion of the highways specified in the certificate. This document is the certificate of convenience and necessity.

The certificate is the very basis of the carrier's right to exist. The title which it conveys is the foundation of the enterprise. To a large degree the characteristics of the certificate determine the value, security and permanence of the investment in the business.

The two most striking features of the certificate of convenience and necessity are the slenderness of the property rights conferred, and the diversity between the several States as to the scope of these rights.

It must first of all be realized that the title conferred by the certificate is a species of property which is created wholly by legislative act, and, therefore, the rights which the owner acquires depend exclusively upon the language of the statute under which the certificate is issued. In case the language of the statute is perfectly clear, precise, definite and explicit, there can be no doubt as to the extent of the rights conferred.

However, it seldom happens that legislative pronouncements attain the precision of mathematical expression. Statutes are usually more or less ambiguous and invariably leave more or less to inference and judicial interpretation. In such case the legislative intent as to the scope of the rights conferred governs. If that intent can be determined by an examination of the terms of the statute, or similar statutes, or the circumstances under which the legislation was enacted, or the purposes sought to be accomplished, well and good. But legislative intent is an elusive quantity and if it cannot be tracked to its lair it is a cardinal rule of statutory construction that grants of private rights in public ways shall be construed most strongly in favor of the public and against the grantee; that is, if the legislative intent to confer a given right upon a certificate holder does not appear either expressly or by necessary implication, the statute will be construed in such manner as to deny the existence of the right.

Then, too, it is important to realize that the primary purpose of legislation requiring motor carriers to secure certificates is not to confer property rights on the grantees but is to promote the public welfare by excluding unnecessary and cutthroat competition from the highways. In fact, it has been the thought of most legislators that the motor carrier industry is too new and untried an experiment to be the recipient of any very substantial rights in the public ways.

Bearing in mind, then, the source of the rights of the grantee in the certificate, and likewise bearing in mind the necessity of deriving much of the meaning of the certificate by construction and interpretation of statutes, and still further bearing in mind that there are 48 different State legislatures passing the statutes and 48 different Supreme Courts interpreting them, it is not surprising that there is a high degree of diversity as to the detailed characteristics of the property interests conferred.

Small Property Interest

Still again, bearing in mind the primary purpose of the legislation and likewise the rule of construction which operates most strongly against the grantee on all doubtful points, it is not surprising that one finds that the holders of the certificates acquire no very substantial property interests from them.

It will serve as a sufficient illustration of the characteristics in question to examine the certificate of convenience and necessity with respect to two of the most valued and most common attributes of ordinary property interests, viz., the right to assign and transfer one's interest, and one's right to retain that interest as against all the world unless one is paid just compensation for its loss.

First consider the right to assign and transfer. The owner of real property may in general assign or transfer his interests almost at will. In fact, most restraints upon the alienation of real property are regarded by the law as contrary to public policy and are held void for that reason. Then, too, most of the gas, electric, waterworks and railway franchises are expressly made assignable nowadays, although assignment is not permitted unless provided for in the franchises or in the statutes under which they are issued.

On the other hand, the certificate of convenience

* Portion of a paper presented at the recent annual convention of the Michigan Motor Bus Association.

and necessity is in most States unassignable. It is regarded as personal to the grantee. In this respect it resembles a mere license rather than a property interest. This is the rule in Michigan. So strictly personal is the certificate held to be that its owners cannot organize a corporation and transfer the certificate to it, even though he be the sole owner of the stock of the corporation. Neither can an individual form a partnership and transfer his certificate to it, nor can a certificate issued to a partnership be transferred to one of its members. This is the rule in most States today.

Assignable in Ohio

In some States, such as Ohio, the certificate is assignable with the consent of the commission, but of course, this is virtually nugatory because the commission may grant or withhold its consent upon the same grounds and for the same reasons that it may grant or withhold a new certificate.

The Ohio Supreme Court has said: "It has been shown (by recent decisions of this court) that a certificate of convenience and necessity is not property. There being no property in a certificate there can be no confiscation" if it is taken away. Under such a theory the tenure of the motor carrier industry is insubstantial to say the least.

To return to the matter of assignment, we find in a few States, by express statutory provision, such as Kansas, and in a few other States by judicial interpretation of statutes which are silent concerning the right to assign, such as New York, that the certificate is assignable. So the assignability feature illustrates both the diversity factor between the several States and the fact that in most states this very substantial and valuable right which appertains to most property interests does not accure to the motor carrier by virtue of his ownership of a certificate of convenience and necessity. The privilege of assigning the certificate would add substantially to its market value, would aid consolidations and reorganizations, and would simplify the many cases of bankruptcy, death and similar contingencies.

As a further illustration of the nature of the certificate of convenience and necessity, consider the right of the holder thereof to retain his property interests therein so long as he chooses, or to put it differently, consider the power of the State to terminate the interests in whole or in part by revocation. The owner of real property is, of course, entitled to retain his fee so long as he desires, even as against the State unless just compensation is paid.

All of the more recent enactments requiring certificates, and most of the commission regulations promulgated under general or special statutes, empower the commissions to revoke or alter the certificates of convenience and necessity. The grounds for revocation vary. In some states the commission is empowered to revoke in the event of any violation of orders or rules of the commission or for a violation of statutory provision. This is the rule in Michigan, Illinois, Idaho, Maryland, Montana, New Jersey, North Dakota, South Carolina, Virginia, Washington and West Virginia. Such provisions are not satisfactory. Since both the statutes and the rules of the commission often cover the most minute details as to manner of operation and the conduct of the carrier, occasional violations cannot always be avoided even with the exercise of great care. Certificates may be revoked for comparatively minor infractions which have no substantial connection with the rendition of adequate service or the safety and convenience of the public. The tenure of the carrier is made decidedly precarious.

In other States the power of the commission to revoke, alter or amend a certificate is accompanied by the sole limitation that such action must be "for good cause" or some words of similar meaning. This is the rule in Ohio and also in California, Iowa, Kansas, Louisiana, Oklahoma and Oregon. Under such statutes the commissions possess broad discretionary powers with reference to revocation, and the possibility of a carrier whose certificate has been revoked securing from the courts a review and reversal of the commission action is slender indeed. However, the fact that the commission must act in a fair and reasonable manner in exercising its discretionary power is some protection.

We find that the courts of New York State are tending strongly in the direction of holding the certificate of convenience and necessity to be something akin to a perpetual franchise and hence a very stable property interest.

In New York the carrier is completely protected against revocation. The public, however, is unprotected. The certificate and the consent are too stable, in my judgment for the public's good.

In order to guide the legislative hand intelligently in the formulation of future legislation, definite controlling principles should, if possible, be evolved.

There are two conflicting factors which play upon the problem. In the first place, it is clear that a financially sound structure cannot long rest on a foundation of quicksand. To be attractive to capital any field of investment must offer protection to the capital invested by a reasonable assurance of permanence and stability. Too broad a power of revocation reserved in the State or a State agency cannot continue to be acceptable to investors.

On the other hand, there are the interests of the public to be considered.

Compromise is Needed

A fair compromise between these conflicting interests must be attained if the motor industry is to prosper and to measure up to its possibilities. The conferring of perpetual franchises, such as seems to be the more or less fortuitous situation under the New York law, is unfair to the public. On the other hand, a too plenary power of revocation which permits the termination of the certificate for minor infractions of statutes or orders having no substantial connection with the public interests, or even that which permits a termination on such broad and elusive grounds as "for good cause" seems unfair to the industry.

Considering all of the elements which affect the determination of a fair compromise between the conflicting interests of the public and the industry at the present time, it would seem that a suitable standard to govern the power of revocation might be couched in some such terms as the following:

"This certificate may, after reasonable notice and hearing, be amended, altered or revoked by order of the Public Utilities Commission when it appears that, because of *gross* or *wilful* violations of the law or of orders of the Commission, or because of *other conditions*, continued operation under the certificate will be clearly prejudicial to the public welfare."

Under such phraseology the public interest would be adequately protected and a far greater degree of stability would be accorded the investment in motor bus lines. A more just and equitable balance of interests than that which exists under most of the present laws would be attained.

Buick Foundry *Gives Men* Better Working Conditions

Brighter and cleaner atmosphere one of main achievements in laying out of plant. Equipment throughout is notable for time and labor-saving features.

By A. F. Denham

Making cope and drag halves of cores on the same machine. This photo shows the two core halves in the molds with wires inserted to bind them together. The two halves are then pressed together pneumatically to form the core. Similar "roll-over" machines are also used to make casting molds

FOUNDRIES for many years have been regarded as hot, smoky, dusty, disagreeable places to work.

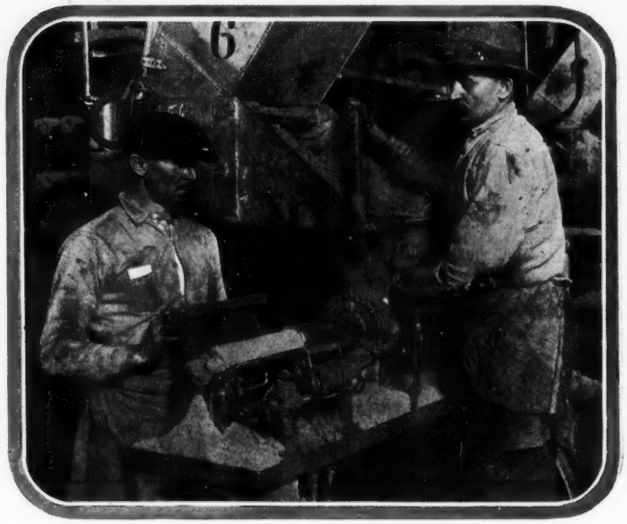
Chief of the characteristics of the new foundry plant put into operation by the Buick Motor Co. last month, as announced in these columns, is the great attention which has been given to alleviating these conditions.

While the installation is replete with machinery representing the latest developments in foundry practice, and numerous labor-saving devices, probably one of the major achievements is that working conditions in the foundry are as good as in better class machine shops.

Molds are assembled on moving conveyors, molten metal is poured into them while in motion from ladles hung from overhead cranes, after which the molds enter a shroud over the conveyor line which takes away heat and gases generated in casting and which in a normal foundry are allowed to escape into the air. Mold and facing sand is fed by overhead hoppers in the quantities required, keeping floors clean and eliminating dust.

For each type of casting produced in the new foundry there is an oval conveyor on which all operations except core-making are performed. Inside the oval and toward one end are the machines for making molds in the drags. Further along are those on which the cope halves of the molds are made. The drag halves are placed on the conveyor adjacent to the machine on which they are molded. Cores are placed in them and when the conveyor reaches the cope machines the copes are placed on top.

At this point of the line and outside of the oval



Like a meat grinder in operation, this barrel core machine is almost entirely automatic. One operator feeds in sand while the other cuts off the cores and places them on trays, which, hung from a conveyor, take the cores through the baking oven

there is a paralleling overhead monorail, also oval in shape, upon which run the cranes supporting pouring ladles. As usual, two men handle the pouring ladle, although, of course, with the overhead support larger ladles can be used. The men doing the pouring stand on a platform adjacent to the mold conveyor and move at the same rate of speed as the conveyor.

The systems are so timed that when one ladle is empty it will have arrived at the point of the casting conveyor line where the molds enter the shroud mentioned above. The ladles then continue past the end of the conveyor line to a master supply ladle running also on a power-operated monorail across the ends of the casting line conveyors. Since there are several pouring ladles for each foundry line, there is an uninterrupted procession around the oval of full and empty pouring ladles.

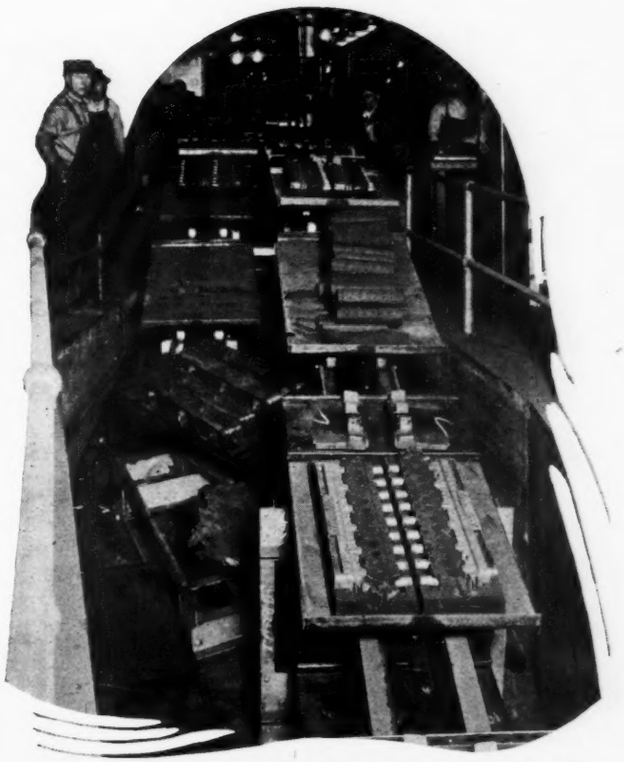
The speed of the foundry conveyor line is so timed that when the mold containing the casting has reached the beginning of the oval again, the casting will have cooled down from the pouring temperature of around 2700 deg. Fahr. to a temperature at which the casting should take a quick chill. At this point, casting, sand, and all are dumped from the mold onto a shake-out

Large flat surfaces of finished baked cores are ground off on this and similar machines, with continuous feed rotating table

grate eccentrically power driven. The mold sand falls through this grate to a belt conveyor below which takes it to the reclaimers.

The castings are taken from the end of the shake-out grate and are hung on a conveyor which runs outside the building and doubles back and forth a number of times under a roofed-in skeleton structure. This conveyor then dips down into the knock-out room at which point castings have cooled sufficiently to permit of handling. In the knock-out room pneumatic air hammers are used to loosen the remainder of the clinging sand. From here all castings go to the tumbling mills.

While the above general lay-out applies to cylinder block and cylinder head castings, other foundry lines are similarly operated. On the piston line all operations are similar, with the exception that cores are not used. In the piston molds the cope has merely a



Saving space is accomplished on this conveyor installation, which takes finished cores to the casting floor and returns rejected cores, by having the conveyor double back under itself

cylindrical depression while the drag has projecting parts forming the cores for the piston interiors.

All operations following the assembly of molds are identical with those on other lines until the molds are ready to be dumped. In the case of the pistons the contents of the mold are not thrown on a shake-out grate, but into a hopper through which they fall into a revolving mill in the basement, which, by means of sifters, etc., separates the sand from the pistons, the sand falling through onto a belt conveyor and thus back to the reclaiming machines, while the pistons are ejected from the mill onto a conveyor which takes them back to the main floor for cooling and cleaning.

Shockless Jar Machines

Machines used for making molds are the shockless jar type. They are provided with cork cushions to take up the vibratory waves, enabling them to be placed on practically any type of foundation. Vibratory and pounding actions are performed pneumatically on these machines. They are also provided with a roll-over feature, eliminating the need of hand-clamping of bottom boards to the molds. With the sand in the mold, a board is placed on top of the mold, the machine clamps the board and mold together automatically, turns both over and deposits them onto a swinging arm below the machine from which bottom board and mold are lifted and placed directly on the adjacent casting conveyor.

A number of shockless squeezers are also used throughout the plant. On these both cope and drag are formed, the drag is turned over onto the cope, the two are squeezed together pneumatically at a pressure regulated to the permeability of the sand, clamped together automatically, rolled over and de-

posited onto a swinging arm similar to those on the other machines. With the squeezer type much pounding is eliminated. As previously mentioned mold and facing sand are fed into the molds on the machines by overhead hoppers. Facing and heat sands are mixed at the hopper by air in measured amounts.

Since all molding sand is passed through reclaiming machines, provided with crushers and magnetic separators, only about 1 per cent per day of bond has to be added. Core sand, of course, cannot be reclaimed, as it changes its characteristics after baking. The method of manufacturing cores, however, is very similar to that making castings. Aluminum core boxes are used, on jar types of machines, air operated. These are naturally varied in character according to the type of core. In some cases squeeze type molds are used. In these each half of the core is prepared in its mold, with metal reinforcements in each, bent wires are then inserted projecting above the core halves, after which one of the mold halves is turned over onto the other and the two are squeezed together. The projecting wires mentioned reinforce the joint thus made so that the result is of homogeneous structure and strength. Here again the squeeze pressure is regulated pneumatically according to the permeability of the sand. As with the heat sand, core sand is fed to core molds by overhead hoppers.

Another interesting type of core making machine is that used for turning out barrel cores. The operation of this machine is practically identical with that of the common household meat grinder, power driven. Mold sand is fed from overhead into a hopper on the machine and is forced out through the end as a finished cylindrical core by means of a screw feed in the machine. A manually operated control starts and stops the screw feed. Cores are cut to length by properly spaced thin wires incorporated on the machine itself. Naturally very high production is achieved with this type of apparatus since the operating speed is governed only by the time required to remove the finished barrel cores from the machine.

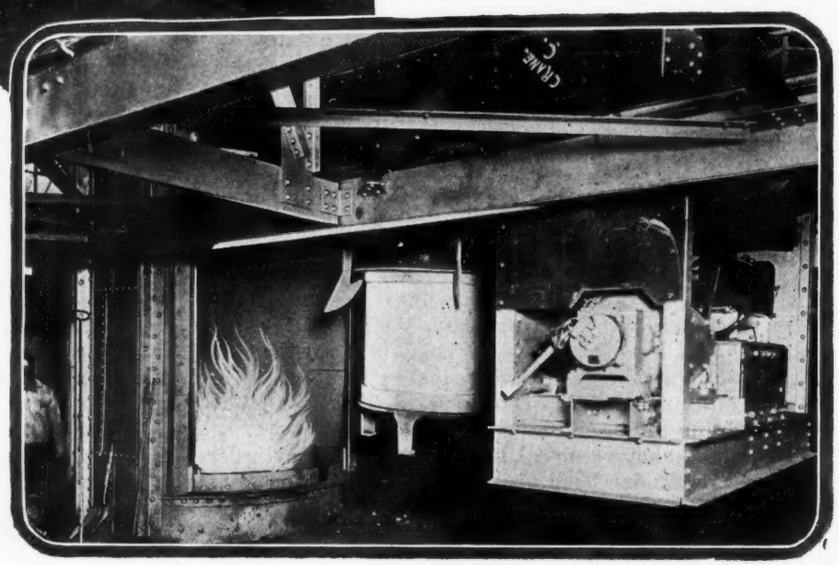
Conveyor to Baking Ovens

Finished cores are placed on stacks of trays attached to a moving endless conveyor which takes them directly through the baking ovens, of which there are both horizontal and vertical types. After they have passed out of the ovens the cores are removed from the conveyor and placed on another adjacent conveyor which takes them to the foundry floor where they are placed in bins next to the casting conveyor line. The core conveyor is also of the endless type. It consists of a single chain on which are centrally-mounted and pivoted trays, the chain running on rollers. An unusual feature of this conveyor is that it doubles back under itself from the foundry floor, thus reducing by one-half the floor space which would otherwise be required. The return part of the conveyor is used for taking back rejected cores to the core room.

Surface grinders with automatic feed, constantly revolving tables, are used to trim the flat surfaces of the larger finished cores, while hand filing is used for trimming the edge of parts of more intricate nature. A special clay is used in this foundry as in all other General Motors units which combine the properties of a number of clays and has a refractoriness of over 2500 deg. Fahr.

The three types of castings being produced at present at the foundry—the cylinder block, cylinder head and piston—are of the semi-steel type. Although the quality of metal produced is practically that of 2 per cent nickel steel, the actual composition as fed into the cupola is

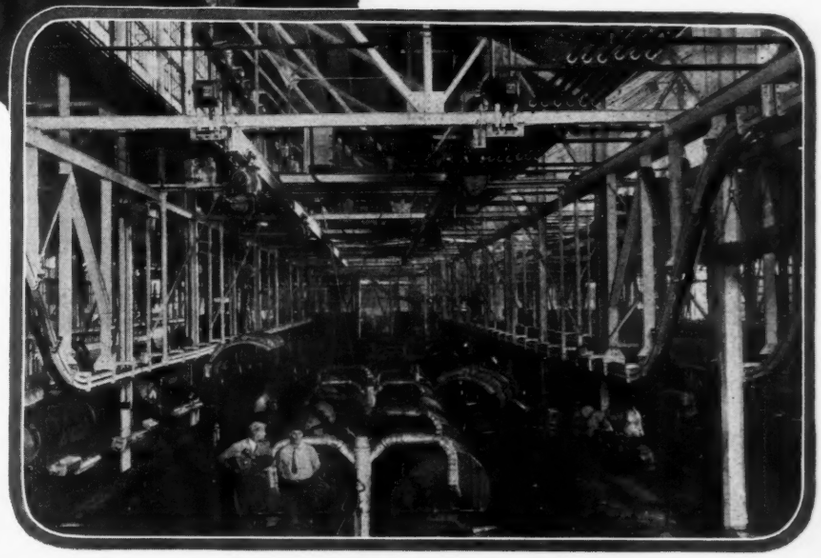
Above—Pouring ladles are supported from overhead monorails. Note main supply ladle in background, mounted on an electric overhead crane



Right—Eliminating manual labor in charging cupolas. Bottoms of the metal buckets are conical in form and are dropped to dump the metal into the cupola. The crane shown here is provided with a hoist which raises the bucket from the ground to the third (charging) floor

Left—Pneumatic chisels and grinders are widely used for trimming finished castings. Note large grinder at left for finishing off flat surfaces for locating in the machine shop

Below—Finished castings are brought by conveyors from the knockout room to the tumbling mill shop shown here. Note also roller type conveyors used to permit more rapid charging of tumbling mills



2 per cent chromium and 1 per cent nickel. The 2 per cent nickel quality is obtained by using a high percentage of silica, this running around 2.6 to 2.7 per cent, about 40 to 60 points higher than usual in this type of metal.

Much manual labor has been eliminated in the charging of cupolas. Ingot metal and scrap is dumped into bins at one side of the foundry. An overhead crane provided with an electro-magnet transfers the necessary charge into a steel bucket. The magnet hoist is provided with a scale so that the amount of metal can be accurately weighed. Electrically-driven trucks are run under the buckets and moved to a point near the base of the cupola where a winch from an overhead crane on the third floor attaches to a hook projecting from the bottom of the bucket over its top, and hauls the bucket to that floor through a steel stack. This crane then runs over to one of the six cupolas. Hooks on the crane hold the bucket proper, and the metal is dumped into the cupola by lowering the conically shaped bottom out of the bucket. Coke and limestone are fed into the cupola from the opposite side by overhead cranes loaded from overhead hoppers supplied from coke and limestone elevators. Each of the six cupolas takes a 4000 lb. charge.

Tumbling and Trimming

Finished castings, after cooling, are all passed through tumbling mills in a separate structure. From here the larger castings are placed on roller conveyors and taken to the trim shop where locating surfaces on cylinder blocks and heads are trimmed by dry grinders hanging from ball and socket joint arms from the roof. These grinders are belt-driven from individual electric motors which balance the grinding wheel. Pneumatic chisels and small pneumatic grinders are also used here for trimming of smaller faces and parts. Castings are then placed on a conveyor which takes them directly through the sand blast to water test equipment, after which they are ready for transfer to the machine shop, this transfer also being performed by conveyors.

Tractor Problems Analyzed

THE Kinematics and Dynamics of the Wheel-Type Farm Tractor are dealt with in a pamphlet by E. G. McKibben, assistant professor of agricultural engineering at the University of California, which also contains a discussion of Prof. McKibben's work by J. N. LeConte, professor of engineering mechanics at the University of California. The pamphlet is a reprint of a series of articles which appeared in the monthly journal of the American Society of Agricultural Engineers. The treatment covers such problems as the possible motions of a tractor, determination of the center of gravity, external forces, turning moments of external forces, stability, supporting soil reaction and drawbar pull.

Many of the conclusions reached were verified by experiments, and photographic illustrations of these are given. All conclusions reached are summarized. Prof. McKibben uses the analytical method and Prof. LeConte illustrates the application of the graphical method of analysis to tractor problems.

THERE is no automobile manufacture in China, although some bodies are built; but in Japan there are now two automobile industries—the Otomo, made by Hakuyosha, which, it is believed, produced in 1926 less than 200 units; and the Ishikawajima Shipbuilding & Dockyard Co., which operates under a Government subsidy of 4500 yen for each truck and 3250 yen for each bus and which supplies trucks and buses primarily to the army.

NEW DEVELOPMENTS—Automotive

New 3-A Turret Lathe

THE WARNER & SWASEY CO., of Cleveland, Ohio, announce a new No. 3-A turret lathe with 3½ in. bar capacity, as shown in Fig. 1. The head and bed are a single casting of semi-steel. This casting is said to be uniformly hard, with a smooth bearing surface free from spongy iron. The ribbing and weight distribution have been arranged so that stiffness is obtained without great bulk.

The narrow construction of the all-geared head, illustrated in Fig. 2, has been made possible by the use of

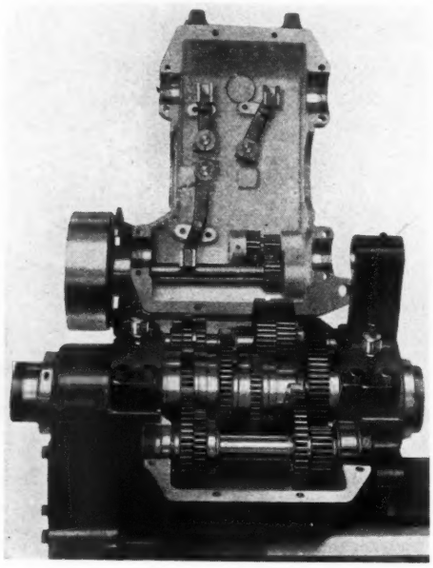


Fig. 2—All-steel geared head of turret lathe

a short, hollow spindle and short gear shafts. The shafts themselves run on Timken bearings. The gears, running in a bath of oil, have ample overload capacity. Twelve spindle speeds are provided, giving a finely graded range of surface speeds for work of different diameters. Forward and reverse motion are obtained through cone-type friction clutches, and the various speeds through sliding gears.

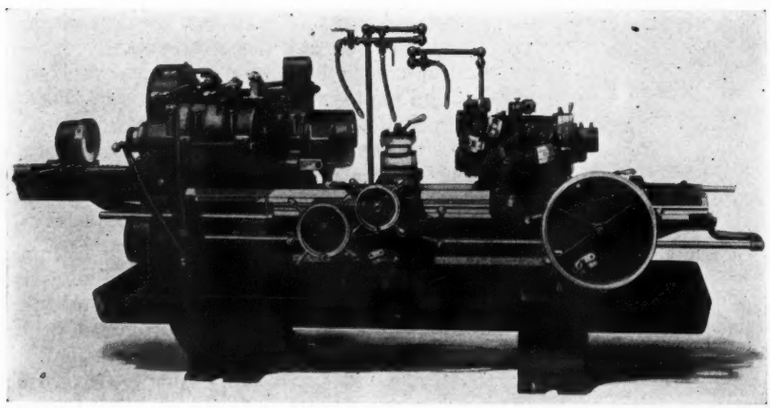


Fig. 1—Warner & Swasey turret lathe of 3½ in. bar capacity

Bed ways of V-shape keep the carriages for both the square and the hexagon turret in alignment, and are protected by way covers of heavy-gage pressed steel. It is stated that machines with such way covers that have been in operation for two years still move with unusual freedom, and that the original scraper marks are still visible on the V's.

The side carriage is of the well-known Warner & Swasey type, permitting combined cuts from both turrets. Sixteen longitudinal and cross feeds are provided for the side carriage, giving two overlapping ranges, for hard and soft metal.

The hexagon turret carriage is provided with a circumference binder which clamps the turret rigidly to the saddle. The tools for the hexagon turret are bolted from the inside and centered by large projecting bosses, resulting in short overhang and rigid tooling. Sixteen right and left-hand longitudinal feeds are provided for the hexagon turret. The power rapid traverse moves the hexagon turret back and forth.

The gear trains for both the square and haxagon turrets are all-steel, properly hardened, and are of sufficient size to make possible high feeding pressures, especially for drilling. Both carriages may be fed independently, thus making it possible to use the best feed under all circumstances. All operating and feed levers are conveniently located.

Model K Cyclone Hoist

THE Chisholm-Moore Mfg. Co., Cleveland, Ohio, has recently developed Model K Cyclone hoist, which is said to be considerably more efficient and longer lived than previous models. Improvements have been made principally by the addition of anti-friction bearings, there being eight ball bearings, four roller bearings and one Timken thrust bearing employed.

The four eccentric roller bearings are now built in one complete unit which eliminates the loose rollers used in former models. The lift wheel is made of a special alloy, developed by Chisholm-Moore, which gives clean and accurate chain sprockets and which showed practically no signs of wear after a test of 320 hr. continuous operation.

All parts of the new hoist are interchangeable, there being no rights or lefts, top or bottom or other generally accepted means of matching parts. The entire mechanism is inclosed in a dust-proof, oil-tight frame.

New G. E. Motors

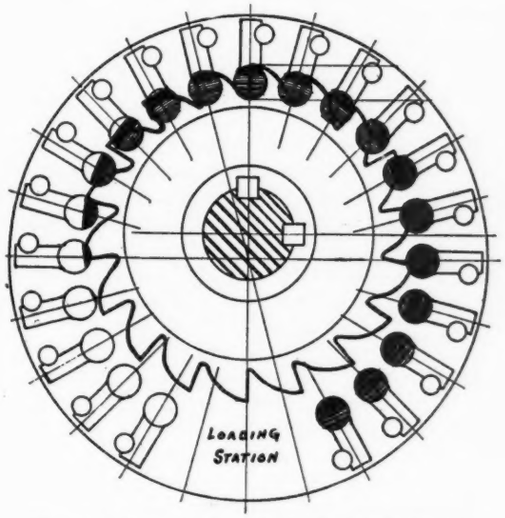
GENERAL ELECTRIC CO. has developed a new line of motors for use with electric hoists and similar applications where intermittent operation and high starting torque are operating characteristics. The line runs from 1 to 10 hp. in the direct current types; from 1 to 11 hp. in single speed, two and three phase, and from 1 to 5 hp. in the single-phase alternating current types.

Parts, Accessories and Production Tools

The new motors are totally inclosed and all parts are well protected. Bearings are of the waste-packed sleeve type. Direct current motors are series wound. Polyphase a-c. motors have high resistance rotors while the single-phase motors have a very high starting torque. All the motors are built with the shaft extension away from the drive to take a brake and the motor end shield is fitted with pads and bosses upon which the brake can be mounted.

Interesting Feature of Miller

AN interesting feature of the 48-in. tilted offset miller manufactured by the Osterlein Machine Co., Cincinnati, Ohio, which was described briefly in *Automotive Industries* for Sept. 3, 1927, is the fact that both



Showing how tools and work rotate in opposite directions in Osterlein tilted offset miller

the tools and the work rotate in opposite directions, so that productive time with this machine is considerably lessened.

The cutter is completely surrounded with parts to be milled, then the cutter center is offset from the work center to obtain the proper depth of cut and the table and the cutter are started revolving in opposite directions. This, of course, increases the working arc of the cutter over normal practice and so results in increased production.

Internal Gear Type Clutches

INVOLUTE teeth have come into quite extensive use in connection with both friction and positive clutches in automotive practice and the Fellows Gear Shaper Co. of Springfield, Vt., has issued a booklet entitled Internal Gear Type Clutches which outlines the advantages inherent in this type of clutch, the principles of design and the methods of cutting the teeth, and contains tables of tooth proportions. According to this booklet, several advantages result from the application of the involute tooth form to clutch engaging members, as follows: The involute can be produced accurately and economically. When applied to clutch teeth, both internal and external members can be so produced that any desired fit can be obtained; in other words, perfect interchangeability is possible; a positive and rigid self-centering drive is assured.

Two distinct methods are employed on the gear shaper for producing the internal member of clutches and couplings, the method used in any particular case being governed by the design of the internal member. When the internal member is made without a projecting hub, the teeth in most cases can be generated with a shank-type of gear-shaper cutter. On the other hand, when the clutch member is made with a projecting hub, which would interfere with the operation of the shank-type cutter, the teeth can be machined on a side-trimming high-speed gear shaper provided with a special cutter that is "cupped" to clear the hub. By this method the teeth are formed to shape and the blanks must be rough-drilled prior to side trimming, to permit of the insertion of the side-trimming cutter.

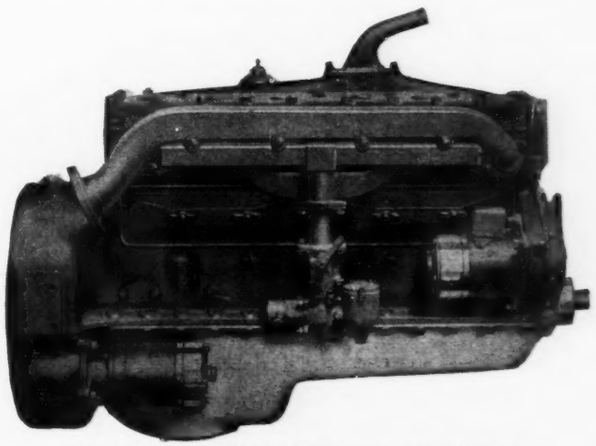
Six-Cylinder Waukesha Engines

TWO new six-cylinder engines have been added to the line of the Waukesha Motor Co. They are designated Models 6-XK and 6-XL—the former being 3¾ by 4½ and the latter 3½ by 4½. In other respects, the two engines are practically identical.

Both have the Ricardo head, standard with all Waukesha engines. The seven-bearing crankshaft has 2⅜-in. diameter journals and, in connection with the combined cylinder and crankcase construction and heavy cheeks, is said to give unusually smooth performance and absence of critical vibration although neither double flywheels nor dampers are employed.

Full pressure lubrication delivers oil to 19 bearings which include those of the crankshaft, the connecting rods, front magneto shaft and idler gear. A Hall-Winslow Oil Filtrator is optional equipment at extra cost.

The cooling system has been designed with large free water passages for thermo-syphon operation but water pump can be supplied as optional equipment.



Side view of Waukesha's new six-cylinder engine

Accessibility has been obtained by casting the cylinders and crankcase en bloc, using a one-piece cylinder head, providing large openings which give access to valve tappets and springs, and various other features of a similar nature.

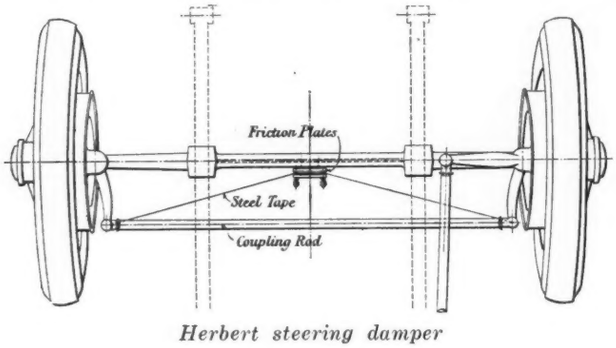
Recommended speeds are 1800 r.p.m. for continuous service, at which the larger engine develops about 58 hp. and the smaller about 50 hp., and 2400 r.p.m. maximum for intermittent service at which speed the developed horsepowers are about 66 and 58 respectively.

Materials used in the engines are as follows: Crankshaft, nickel-chrome steel, heat-treated; crankcase, cast iron; connecting rods, S. A. E. 1045 steel, heat-treated; intake valves, chrome-nickel steel; exhaust valves, Silchrome; cylinders, chrome-nickel iron; timing gears, semi-steel and steel. Main bearings are of the babbitt-lined, bronze-backed type.

Provision is made for mounting a standard magneto or distributor, but these are not furnished. The Waukesha governor can be furnished when specified. The 6-XK weighs 800 lb., and the 6-XL 825 lb.

New British Steering Damper

THE steering damper illustrated by the drawing herewith (reproduced from *Engineering* of London) was developed by the Herbert Engineering Co., Ltd., of Reading, England, and is fitted to its H. E. cars. Its purpose is to control or prevent wheel wobble or



Herbert steering damper

flapping of the steering wheel. It consists of a narrow steel tape with the ends attached to the ends of the tie rod. The center is caught up between spring-cushioned, fabric-lined steel plates, fixed to the axle beam. The device, apart from being simple and easily attached to any front axle, is stated to effect its purpose, and has attracted some attention among car makers and tire trade experts.

Chevrolet 4-Speed Transmission

A FOUR-SPEED transmission for its 1-ton truck model is being offered by the Chevrolet Motor Co. This transmission, which lists at $65 including cost of installation, is featured by the fact that it is absolutely interchangeable with the three-speed unit standard on the 1-ton truck and other models. Since mountings and installation dimensions are identical, it is necessary only to lift out the three-speed unit and drop the four-speed gearset in its place.

The transmission is particularly designed to provide extra pulling power for soft ground and steep grades. Provision is made for installation of power take-off at the left side of the transmission case.

Several innovations for Chevrolet are found in the new unit. Both countershaft and the splined main shaft are mounted on anti-friction bearings. The countershaft is mounted on a New Departure ball bearing at the rear and a Hyatt solid roller bearing at the front. New Departure ball bearings are also used to mount the splined shaft, with a Hyatt spigot roller pilot bearing. In fact, the only place where anti-friction bearings are not used is on the dead shaft carrying the reverse idler gears which are mounted on this shaft on bronze bushings.

A further innovation for an automotive vehicle in Chevrolet's price class is found in the use of high-grade nickel alloy case-hardened steel for the gears. In spite of the use of high-nickel steel, however, gear faces are not narrower than before, but are of the same width with even a slight increase in face width of two gears. This has been made possible through the use of a peculiar design of reverse gear engagement. The latter is of the double mesh type with the two gears on the reverse idler shaft straddle-mounted with the shift fork in the center between the gears. The forward gear of this unit meshes with the countershaft reverse gear, while the rear gear engages with the first speed sliding gear on the splined main shaft. The dead reverse idler shaft is mounted on the right side of the transmission, with the rear end keyed against rotation.

To effect the shift to reverse, a latch is depressed on the gear shift lever and the lever is brought out to the left of the H-shift and back. First speed in this transmission in the shift takes the place of the usual reverse position in the S.A.E. shift, with second, third and fourth speeds in place of the usual first, second and third respectively. With the latch depressed it is possible to shift into either low or reverse, thus making it possible to rock the truck back and forth to get out of mud holes or sand pits.

Gear reduction in second, third, and fourth correspond nearly exactly with those of the low, second and third gears of the three-speed unit. In effect this new transmission therefore provides an additional low speed having a very high reduction. Following are the gear ratios for both three and four-speed units, these being overall reduction, with the standard axle reduction ratio of 5.43 to 1 retained:

Speed	Three-Speed	Four-Speed
Low	18.04	37.05
Second	9.62	18.87
Third	5.43	9.53
Fourth	....	5.43
Reverse	22.08	38.00

Low gear reduction therefore is increased by 107 per cent.

Two assemblies are used to make up the countershaft. The countershaft drive gear and reverse gear are machined integrally on the forward end of the shaft with first, second and third speed countershaft gears machined on the rear end of the shaft.

ACCORDING to a foreign consular report, the British cycle and motorcycle industry is making continuous progress. An organization of manufacturers is under way for the purpose of cooperative advertising in foreign countries. The tendency of the moment is toward mass production of parts and assembly in the country of destination, the object being to avoid the payment of heavy import duties. The most popular types of motorcycles are those of medium power of from 21 to 31 cu. in. displacement. Britain's principal competitors in this field are the United States and Belgium.

Just Among Ourselves

Increase in Number of Eight-Cylinder Models

THE eight-cylinder car has become a regular part of American automobile production programs. Back in 1923 about 11 per cent of the models on the market carried eight-cylinder engines; by the first of 1927 that proportion had increased to 29 per cent. When all the news is in from the 1928 New York and Chicago shows it seems certain that the percentage will have been boosted still higher. Eight-cylinder models will be incorporated in the lines of at least two or three manufacturers who previously have had only fours or sixes; Velie already has announced its entrance into this group. Then, in addition, there probably will be new eight-cylinder models added to the lines of some makers who already have been building eights in the past. Also, of course, there is the same old rumor about the possibility of a Ford eight within the next year or so. There are more manufacturers today who have eights in their line than there are manufacturers who do not have eights. Our check indicates that about 20 car organizations have one or more eight-cylinder models and that only 19 are without eights today.

* * *

Manufacturers Want Stable Sources of Supply

JUST heard of an actual incident the other day which helps further to indicate that a good many vehicle manufacturers are looking to the stability of their sources of supply with greater care than ever before. A supply salesman was talking with the executive of a large car company. The conversation got around to prices, net profits, etc. The executive's statement, as reported by the salesman, ran something like this: "We never buy from companies which are not making a profit; we expect our suppliers to make money—on our business as well as that of our competitors. When we find that one of our suppliers is consistently losing money we begin to look around for another source of supply. We can't afford to take a chance on unstable sources."

* * *

Wrong Addresses Cost $634,428.35

A NOTE just received from our co-worker T. L. Kane, of the Chilton Catalog and Directory, informs us that 12,688,567 pieces of first-class mail containing circulars and advertising matter have been reported destroyed as waste by the Post Office Department last year. Assuming that each of these pieces cost 5 cents, the total loss amounts to the staggering total of $634,428.35. Direct mail long since has proved itself as one of several important phases of a complete merchandising campaign, particularly in the efforts of automotive manufacturers, but the figures quoted do emphasize again the necessity for up-to-date accurate mailing lists if useless waste is to be avoided.

* * *

Motorcycle Taxis Fail in Germany

WE have just received a report from Germany that the motorcycle cabs which were introduced in Berlin about two years ago have been withdrawn from service. The news is interesting because of several similar actual and proposed experiments in this country. The difficulty with the Berlin operation, according to this report, lay in its inability to make a profit despite rather heavy patronage by the public. A few driver-owned motorcycle taxis still are running in Berlin, it appears, but most of the traffic now is going to ordinary type cabs which are operating at the same rate of fare.

* * *

The Item About Lindbergh's Flight

HAVING received several very complimentary and entirely unsolicited comments on the item published in J.A.O. Oct. 22, pointing out that Lindbergh's flight created an illusion as to how easy the feat was, we feel called upon to rise and give credit where it is due. Our colleague, R. L. Cusick, very kindly wrote the item to make up for a paucity of copy left by us when departing for a tour of the Middle West. For the benefit of our readers we will try to make the same mistake again some time.

* * *

Ought to be a Traffic Cop for the Animals

SOME curious experiences were met with in the course of the speed test of 25,000 miles recently staged by Studebaker at the Atlantic City Speedway. One driver, making better than a mile a minute, hit and killed a skunk in the middle of the track. Another made short work of a blacksnake which got in his path. Still another, who drove most of his shifts with a puppy dog as a mascot on the seat beside him, narrowly missed a rabbit, and several of the pit detail one night caught an owl which was hooting near the judges' stand. The test stretched over several week-ends and on Saturday afternoons the men in the pit entertained the drivers by flashing them the football scores which were received over a radio at the track.—N.G.S.

Machine Tool Precision Improved *by* Anti-Friction Bearings

Their use reduces wear and thus makes for greater accuracy and efficiency in production. Many new applications have been found in the last few years.

A NUMBER of applications of anti-friction bearings have been made in machine tools of various kinds during recent years with ofttimes considerably better performance as a result. Some of these installations as well as a few of the general principles upon which all such applications should be based were given at the recent New Haven Machine Tool Show paper by R. F. Runge, vice-president, SKF Industries, Inc., an abstract of which follows:

To those in the machine-tool industry who were pioneers in the application of anti-friction bearings many years ago, considerable credit is due for breaking down many of the old prejudices. This has resulted in a very decided advance and change of opinion during the last two years throughout the industry, so that we find today many important applications of anti-friction bearings in locations which only a short time back were considered questionable.

Anti-friction bearings, to be successful, must show many times the life of the older forms of bearings or considerably less maintenance, resulting in greater number of productive machine hours. The application must be one which is more foolproof than the older types of bearings.

The next item of importance is the use of a bearing which has the absolute minimum of friction. This is quite obvious, as friction means wear, and wear definitely defeats accuracy and quantity of production.

Heat also is directly coupled with the subject of bearing friction. Heating on precision machines is of decided importance, as it will be immediately understood by those who are closely engaged with machine operations on precision work that such machines do not produce close tolerances consistently until the machine has attained its operating temperature. This materially affects machines in which automatic gaging of certain forms is used, so that machine heating due to friction in bearings plays an important part in percentage of scrap production.

If the above elements are realized through the application of anti-friction bearings, then it must necessarily follow that there will be a power saving of some magnitude, or, on the other hand, a greater amount of power delivered to the cutting tools, resulting in increased production.

The machine-tool manufacturers have been most cautious in the past in considering the application of anti-friction bearings to such parts as milling-machine spindles, lathe spindles, grinding-wheel spindles, and workhead spindles on the various types of machines. This is to be expected, due to the requirements of consistent accuracy of performance and also due to the failures of past years, when the bearings had not been developed to as high a standard as at present, and improper types as well as improper mountings were used. This discussion will therefore be confined to the more important machine-tool-bearing locations, and an attempt made to indicate the more modern methods of application which are proving to be most satisfactory.

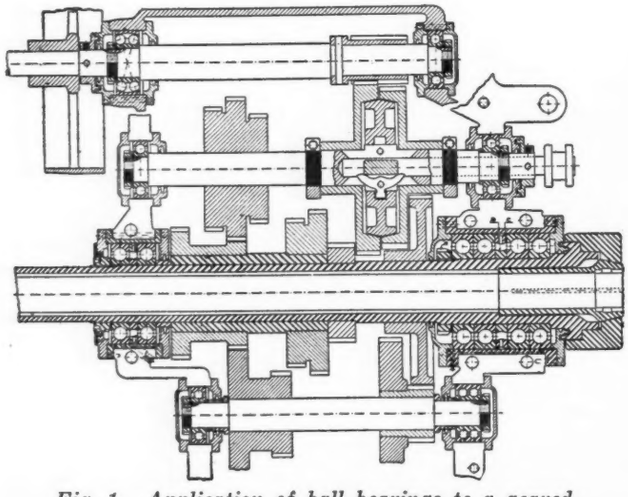


Fig. 1. Application of ball bearings to a geared-head lathe

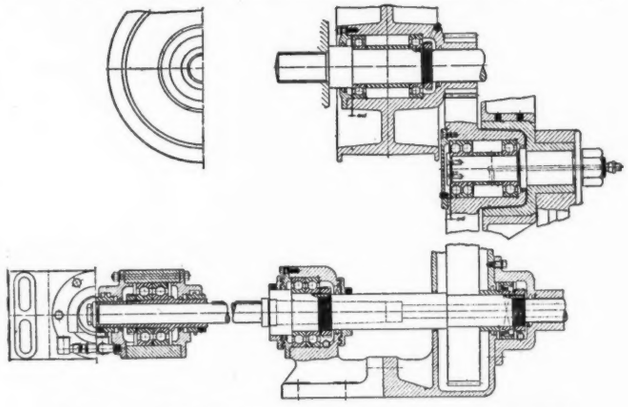


Fig. 2. Application of ball bearings to a milling machine

Fig. 1 shows the application of ball bearings to a geared-head lathe. The important consideration here is the spindle mounting. On the chuck end of the spindle there are two pairs or four bearings recommended. Two bearings are used at the back end of the spindle, where the load is lighter. This mounting gives the maximum of rigidity and, the accuracy of all parts being held to very close tolerance, is sufficient for load distribution over the several bearings.

The bearings in the auxiliary shafts in this lathe

head are more or less general as to type of application. A possible exception to that may be pointed out through the use of the self-aligning type of ball bearing next to the pulley. This design permits the bearing to accommodate itself to any possible deflections due to the overhung belt load.

The spindle mounting is one which is also recommended for precision machines of the centerless, cylindrical, and horizontal surface-grinding types.

Fig. 2 shows a design which applies to horizontal milling machines, the important element of which is also the spindle. In this case, the main spindle is supported on two bearings at the front end and a self-aligning bearing at the back end. The arbor support also carries two bearings. Attention is called to the construction of the arbor support, wherein the mounting can be removed without exposing the bearings or interfering with the lubrication.

On the intermediate gear there is shown a double-row, deep-groove ball bearing which comes directly

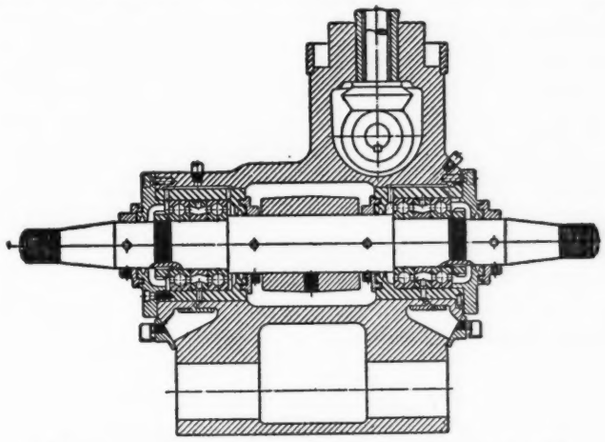


Fig. 3. Grinding machine spindle equipped with ball bearings

under the tooth load, and a single-row bearing at the back end, principally for more rigid stabilization. The idler pulley is the usual type of mounting with regular single-row bearings.

The mounting shown in Fig. 3 is for a grinding spindle for external work. In this it will be noted that the bushing principle is again used. This provides for greater accuracy of bearing mounting, which is of still greater importance where higher speeds are encountered. The same special type of spindle bearing is recommended in this design. Here, again, where load capacity is not so important, the use of two bearings at each end of the spindle is recommended.

Fig. 4 shows a small high-speed internal grinding spindle. Where a few years ago these spindles were operated at about 10,000 r.p.m., speeds of approximately 25,000 r.p.m. are now being regularly used, and in certain unusual cases from 50,000 to 60,000 r.p.m. are being attempted.

Fig. 4 shows again the double-bearing mounting at both the front and rear ends of the spindle, utilizing specially made spindle bearings. The pair of bearings at the front end is locked endwise in order to stabilize the spindle. This design then permits the expansion or contraction of the rear end of the spindle, as the two bearings at this point are permitted to float axially. Due to the special spindle-bearing construction, the two bearings in this design may also be locked through the inner races by a nut, thereby taking out all of the radial and axial looseness and providing for the amount of initial elastic deformation.

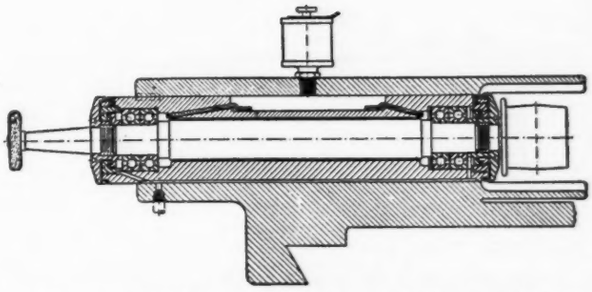


Fig. 4. Another example of a grinding machine spindle equipped with ball bearings

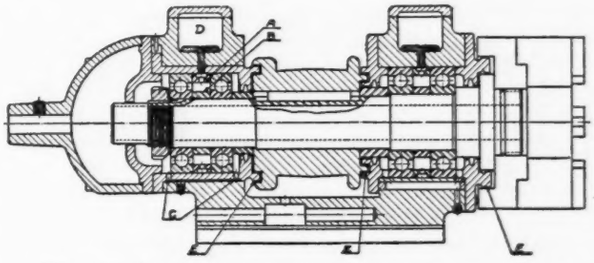


Fig. 5. Application of ball bearings to work-head spindle of grinding machine

The reason for providing for initial deformation in bearings for high-speed grinding-spindle mounts is somewhat different than for those on the heavier spindle applications. In the high-speed internal spindle it is not only necessary to eliminate any play from the bearings, but, due to the high speed of the balls in the raceways and very quick acceleration, it is important that the balls be not allowed to skid on the unloaded side of the bearings. When initial elastic deformation is provided for in the bearing, each ball is definitely driven through the inner race by positive contact. This skidding which takes place in the bearing will naturally set up a slight amount of wear, thus causing looseness.

Fig. 5 is a rather interesting application in view of the fact that for many years it has been considered quite undesirable to attempt to carry the work-head spindle of grinding machines on ball bearings, the general objection being that, due to the slow speed of the work spindle, any eccentricity or irregularities of the bearings would be transferred to the work being ground. The method of mounting as shown in this design, in consideration of the accuracy of the special spindle bearings, completely overcomes that objection and is responsible for even more accurate work than has been generally done on spindles having sliding bearings, as here again the variation in oil film in the sliding bearings is completely eliminated. This construction follows closely those shown previously in so far as bearings and mountings are concerned.

Proper lubrication for ball bearings is important, although it is commonly known that they require a very small amount of lubrication. It is quite necessary, however, that that be of proper consistency, and care should be taken to use a lubricant free from acids and foreign matter.

There have been certain tendencies toward the use of grease in precision and high-speed applications. Grease may be used under certain conditions, but due to the great variety of viscosities of grease, and also the numerous fillers which are used, grease lubrication is subject to a wider range of variation than is oil and is therefore less controllable. For such applications as have here been discussed, years of experience have very definitely shown that oil lubrication is preferable.

American Bodies *Best* Yet Produced, *Says* British Designer

E. C. Gordon England doesn't think they are perfect, however. Believes greater quietude and durability should be sought by insulating body from the chassis.

By M. W. Bourdon

IN a paper read before the British Institute of Automobile Bodybuilders, E. C. Gordon England, dealing with modern methods of body construction, placed the average American quantity-produced body ahead of that of all other nations in its blending of good production practice with artistic and engineering requirements. "When considered on a price and quality basis," he added, "there is nothing in the world to approach the American automobile body."

E. C. GORDON ENGLAND, the British body designer quoted in the accompanying article, exhibited four of his bodies at the recent Olympia Show. Four-door sedans on Erskine and Morris chassis weighed only 450 lb. each. A sports sedan—two-door type—on a three-liter Invicta Six weighed 340 lb., while a sedan on an Austin Seven, seating two adults and two children, weighed but 240 lb.

Nevertheless, in specifying in detail the functions of a body he advocates variations from American practice in order to secure greater quietude and durability, contending that the body as a whole should be insulated from chassis distortion and relieved as far as possible of stresses due to its own inertia and that of its occupants. The principle he advocates comprises a lightweight "shell' flexibly mounted, the seating supported separately and directly by the chassis.

He considers that fabric bodies are unsuitable for quantity production and that all-metal constructions of light alloys represent the line of future development.

In leading up to and developing his main theme the author said:

Engineering Merit Low

"It should not be overlooked that there is a growing tendency of car buyers to take for granted the mechanical excellence of the chassis and to concentrate their attention upon the suitability of the bodywork. Chassis development is far ahead of that body building. The latter has reached a high standard of development regarded from the aesthetic and comfort standpoints, but as an engineering structure the average body possesses a very low order of merit.

"British motor bodies, while comfortable up to a point, lack the inspiration of artistic lines and are far too solidly built without being strong or proof against the stresses to which they are subjected. Too many quantity production bodies bear signs of the use of inferior materials to get down to a low price, when the cheapening should have been done by better use of superior material and available labor.

"In considering design and construction we must keep in mind the manifold functions of motor bodywork. These are: To provide seating accommodation; to protect the occupants from climatic and temperature changes, dust, mud, wind pressure, etc.; to provide comfort, vision and convenience for the occupants, and to carry luggage and impediment. It should afford a pleasing appearance, be silent in use, durable, easy of upkeep and light in weight, the latter in order to detract as little as possible from the performance of the chassis.

"The average body produced in England has not a good balance of those requirements; usually two or three are emphasized and the remainder given scant consideration. American bodies, on the other hand, seem to have a far better balance than those of other nations, though even they fail badly from some aspects.

"As regards general design, body makers do not appear, as a rule, to have had much engineering training, whereas the successful body designer must be a trained engineer with knowledge in the working of metals and other materials by modern methods, and be able to estimate precisely the stresses to which every detail of the body structure will be submitted. I cannot see why the body of an automobile should be considered in any way inferior to the chassis as an engineering proposition.

"As regards seating accommodation, there seems to be a total disregard of the anatomical structure of the human animal by body designers, and I am amazed that so many large producers of motor bodies have failed to give this subject really scientific investigation. One sometimes wonders whether those people who are responsible for the seating arrangements ever drive or ride in cars, or, if they do use them, whether they ever ride for more than an hour on end without alighting and exercising their limbs. I am convinced that a careful investigation would show that, for real comfort in seating, entire revision of present arrangements is needed and that improved standards could be adopted with great economy in manufacturing costs.

"The average seat seems to have been designed with-

out any consideration of the pressure per square inch that the human frame and its covering should have to withstand. No consideration is given to the ventilation of the seat. My own test of seating accommodation is that, before it can be considered satisfactory, I must be able to ride for five hours non-stop without the least discomfort. I may point out in this connection that, so far as I am aware, there is no data in regard to the proper angle for seat and back squab in relation to legroom and seat heights. Yet this seems to me to be one of those things for which there must be a 'best way.'

Better Ventilation Needed

"Greater thought and experience should be devoted to the question of adequate ventilation of closed car interiors. I have yet to find a really draughtproof body, and I find this matter is a sore point with thousands of motorists. Here again, scientific investigation is called for, and the same remark applies to methods and means of controlling the temperature inside the body. Even the exclusion of rain has received scant consideration and in this connection I would particularly emphasize the failure of the two-panel screen.

"Another fault of most bodies is the thickness of both standing and door pillars. Few body designers know that the scientific explanation of the blind spot is to be found in the relationship of the distance of the eye from the pillar and its thickness to the interpupillary distance of the average human skull; the latter is 2¼ in., and, by proper use of knowledge of that fact, blind spots can be eliminated to all intents and purposes.

"Door locks and window lifts are other directions in which but little progress has been made; convention seems to rule that the larger the body and the higher its price the larger must be the locks, handles and all other furniture. Why? The possession of wealth does not imply great physical strength or dimensions, yet undue physical effort is needed to operate the door controls of most high-priced cars. The opening and closing of a door should not call for any display of strength. Then, too, the average so-called adjustable seat is beyond the capabilities of the ordinary woman to operate without undue effort.

"In the matter of luggage accommodating, the French are ahead of all other body builders, for the provision of built-in accommodation is becoming standard practice in French bodywork, as it ought to be on all bodies, in place of a luggage grid.

Silence a Neglected Factor

"It is, however, when we come to consider silence in use and low cost and ease of upkeep that we find so much is lacking. In the first place, the shutting of a door should be a noiseless operation, as far as possible. The practice of fitting immense locks with powerful springs is senseless and unnecessary, and in many cases the angle of the bolt face and striking plate is such that the leverage required to impart motion to the bolt without undue effort is lacking, consequently brute force has to be applied to close the door. The motor bodybuilder has compelled the user to slam doors.

"Quietude has intimate relation to constructional methods. The average designer approaches his work with his mind full of precedents and conventions, but without regard for engineering standards and practice in structure design. He has no data, nothing but tradition and the policy of trial and error to fall back upon. He builds a body that rattles and squeaks; so he adds more material to cure these defects and probably makes matters worse. It does not seem to occur to him to counteract the cause of the shortcomings.

"Apart from chassis distortion, the greatest factor tending to destroy an automobile body is its own inertia, and, particularly in these days of increased engine and braking efficiency, it is of the utmost importance that structure weight should be reduced to the minimum. As things are, it is not uncommon to find the weight of the body and its parts as high as 50-60 per cent of the chassis weight, which is an absurd state of affairs.

"It is remarkable to me that we have, on the one hand, the chassis designer trying all he knows to reduce the weight of his product—knowing that its performance is in inverse ratio to its weight—while, on the other hand, the body builder piles on weight, oblivious of the fact that the inertia of the body is its worst enemy and that weight detracts from performance and adds to running costs.

"In developing my own system I have tried to view the problem from this angle, and have often been able in our first efforts to save as much as 50 per cent of the original body weight in a design comparable in general lines, specification and dimensions. Economy in structural weight means saving in material costs, though more important is the reduction of the destroying effect of inertia stresses.

Started With Airplanes

"It is a matter of history that Monsieur Weymann and I both started as designers and pilots of airplanes at about the same time (1908) and that we both left aviation at the end of the war and turned our attention, quite unknown to one another, to motor body construction. Our independent investigations brought us against the same problem, but we produced diametrically opposed solutions, both of which are sound and effective.

"The problem, shortly stated, is that all chassis are subject to distortion and that by all usual methods of body mounting and building, these distortions are conveyed to the body structure. Weymann's solution was to build a light and flexible structure and cover it with flexible material, which, while adjusting itself to the movements of the structure, would not give rise to creaks or other noises.

"My plan was to provide a light but rigid structure, entirely insulated from chassis distortion and the weight of the passenger load, the latter enabling structural weight to be reduced beyond what would appear to be safe practice. As the shell is a rigid structure it may be paneled in sheet metal, aluminum or fabric, and there are no restrictions as to line or curve. Where fabric is employed it is stretched taut over plywood paneling and there is no possibility of the fabric sagging. Incidental advantages accompany this system of construction, such as exceptional accessibility of the chassis, and ease of removal and replacement of the body when the time comes for a chassis overhaul or extensive repair to be completed.

"One or other of those lines must be pursued by those designers who would make substantial progress toward lighter, silent and durable bodies, and I suggest that the main trend of development will be toward a flexibly mounted all-metal construction in mass-produced bodies and the use of light alloys, for the reason that fabric bodies, if properly built, must entail more hand labor."

Mr. England's broad experience in body designing gives his views more than ordinary weight and his paper has been received with a great deal of interest in British automotive circles.

THE FORUM

Adhesive Power and *Torque* Limited *in* Front Wheel Drives

Hill-climbing ability of such vehicles questioned. Shifting back of front axle is suggested.

Editor, AUTOMOTIVE INDUSTRIES:

In my communication on Front Wheel Drives which was published on page 20 of *Automotive Industries* of July 2, 1927, I pointed out that the adhesive power of the front wheels, in many cases, would not allow of the building up of sufficient engine torque. I now wish to supplement the data there given in order to show the exact limits of the applicability of front wheel drive.

Referring to the accompanying Figs. 1 and 2, let Q_1 and Q_2 be the loads on the front and rear axles respectively; μ_1, the coefficient of adhesion of the driving wheel (Q_1 in Fig. 1) which is assumed to be 0.7; μ_2, the coefficient of rolling friction of the driven wheel (Q_2 in Fig. 1) which is assumed to be 0.03 (see "Huette" I).

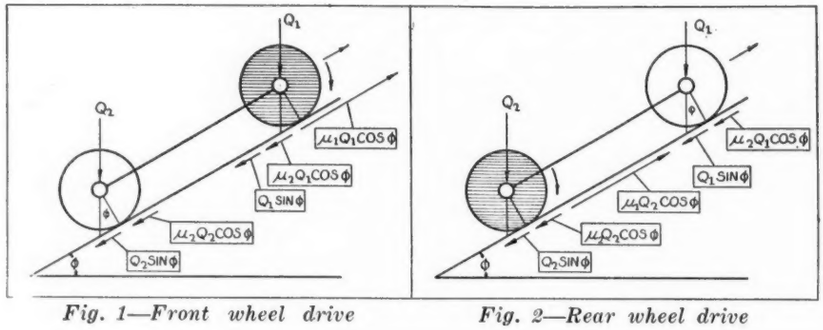


Fig. 1—Front wheel drive

Fig. 2—Rear wheel drive

Fig. 1 represents diagrammatically the front wheel drive and Fig. 2 shows the rear wheel drive on a gradient of $\phi°$. In Fig. 1 the adherence of the front wheels is

$$\mu_1 Q_1 \cos \phi.$$

The resistance to motion of the front wheels is

$$Q_1 \sin \phi + \mu_2 Q_1 \cos \phi.$$

The resistance to motion of the rear axle is

$$Q_2 \sin \phi + \mu_2 Q_2 \cos \phi.$$

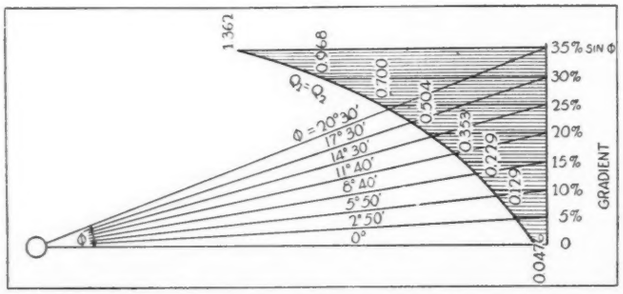


Fig. 3—Limit of ratio of adhesion to rolling resistance for various grades

Therefore, in order that there may be sufficient traction

$$\mu_1 Q_1 \cos \phi \geqq Q_1 (\sin \phi + \mu_2 \cos \phi) + Q_2 (\sin \phi + \mu_2 \cos \phi)$$

and

$$Q_1 \geqq Q_2 \frac{\sin \phi + \mu_2 \cos \phi}{\mu_1 \cos \phi - \sin \phi - \mu_2 \cos \phi} \quad . \quad . \quad . \quad . \quad (1)$$

Q_1 being the minimum load on the front axle which will give traction on this gradient, regardless of the engine torque. It is supposed, of course, that there is a driving wheel torque (engine torque × gear ratio) which is at least equal to $R\mu_1 Q_1 \cos \phi$, R being the radius of the wheel.

In Table I and in diagram Fig. 3 the ratio

$$\frac{Q_1}{Q_2} = \frac{\sin \phi + \mu_2 \cos \phi}{\mu_1 \cos \phi - \sin \phi - \mu_2 \cos \phi}$$

has been computed for various gradients from 0 to 35 per cent, the "sine" being assumed as the percentage of the grade.

In modern passenger cars the ratio $Q_1:Q_2$ is about $=40:60=0.667$. This means that front wheel drive is practical with these cars on roads with gradients up to 24 per cent. For roads with grades of 25 per cent this ratio must be at least 0.700, as may be seen from Table I and Fig. 3.

Very often the hairpin turns of mountain roads have grades of more than 24 per cent, in which case a front

TABLE I

Gradient %	$\sin \phi$	$\phi°$	$\mu_1 \cos \phi$	$\mu_2 \cos \phi$	$\frac{Q_1}{Q_2} = \frac{\mu_2 \cos \phi + \sin \phi}{\mu_1 \cos \phi - \sin \phi - \mu_2 \cos \phi}$
0	0	0°	0.700	0.0300	0.0476
5	0.05	2°50′	0.699	0.0299	0.129
10	0.10	5°50′	0.696	0.0298	0.229
15	0.15	8°40′	0.692	0.0296	0.353
20	0.20	11°40′	0.685	0.0294	0.504
25	0.25	14°30′	0.678	0.0291	0.700
30	0.30	17°30′	0.668	0.0286	0.968
35	0.35	20°30′	0.656	0.0281	1.362

wheel drive would not be practical for a "40:60" car. Rear wheel drive, however, would meet the requirement, as may be seen from the following (Fig. 2):

The limiting driving force of the rear wheels is

$$\mu_1 Q_2 \cos \phi$$

The resistance to motion is

$$Q_2 \sin \phi + \mu_2 Q_2 \cos \phi + Q_1 \sin + \mu_2 Q_1 \cos \phi$$

therefore

$$\frac{Q_2}{Q_1} = \frac{\sin \phi + \mu_2 \cos \phi}{\mu_1 \cos \phi - \sin \phi - \mu_2 \cos \phi} \quad . \quad . \quad . \quad . \quad . \quad (2)$$

Hence the value $Q_2:Q_1$ of equation (2) is the same as the value $Q_1:Q_2$ of equation (1). Consequently we can use the figures of Table I and diagram Fig. 3 too, for the rear wheel drive. With rear wheel drive, however, $Q_2:Q_1$ would be $= 60:40=1.5$ which means that more than 35 per cent grades could be ascended.

In motor buses and trucks most of the load is carried on the rear axle, as a rule. Sometimes the ratio $Q_2:Q_1$ is as high as 80:20 under full load conditions. Front wheel drive, if applied to such vehicles, would have the merit that the whole powerplant with propeller shaft and driving axle could be concentrated on the front part and that the rear vehicle could be freely disposed of for its special purpose.

The efficiency and economy of these vehicles, however, greatly depends on their starting, accelerating and climbing abilities under all road conditions. Front wheel drive, therefore, if applied to these cars would call for a shifting back of the front axle in order to advance the center of gravity and to change the ratio $Q_2:Q_1$ in favor of a greater Q_1.

MAX R. ZECHLIN, DR. ING.

Mr. Zechlin has neglected the fact that the torque reaction virtually transfers some of the load from the front to the rear axle, thus reducing the adherence of the front wheels and increasing that of the rear wheels. This further limits the torque that can be successfully transmitted to a front driving axle.—Editor.

Bus-Trolley System Speeds Up Street Traffic in Detroit

A COMBINATION local and express service with buses taking the local and electric cars the express traffic was inaugurated on Sept. 18 by the Detroit Street Railways. As operated at present on Jefferson Ave., inbound trolleys for a distance of 4.15 miles are operated on an express schedule with a distance between stops ranging from seven to 15 blocks. Paralleling the street railway lines are single-deck 21-passenger Graham Brothers buses which pick up passengers at the far corners of all streets and deposit them, if desired, at the trolley safety zones where express stops are made. Whether boarding a street car or bus, the fare is 6 cents, including a free transfer to the express trains or transfer coaches. The regular 1-cent transfer to intersecting Detroit Street Railway lines is issued on the express cars.

Not only has this system enabled a decrease in transit time of from 20½ to 13½ min. in the express zone, representing an increase in average speed of from 12.1 to 18.4 m.p.h., but a very marked increase in vehicular traffic speed has resulted from the elimination of the large number of local street car stops.

This, however, does not end the story of the advantages gained from this system of transportation. Decided operating economies are also realized. A total of six trains have been eliminated from the service due to the increased speed. Platform costs, representing operators' wages, have been decreased over 11 per cent. Hardly secondary in importance is a 50 per cent saving in power required on the electric lines in the express zone. Other savings naturally will be effected due to decreased wear and tear of equipment with the lessened number of stops and decreased number of units required.

In putting this system into operation the Detroit Street Railways is particularly fortunate in being city-owned. As a result very fine cooperation from the police department and traffic division was obtained for the regulation of traffic lights, the elimination of vehicular traffic passing inside safety zones and the elimination of parking on Jefferson Ave. The last item at first created a good deal of opposition from the merchants along the route, but when these merchants were shown that they could increase their parking facilities considerably over former capacity by using back yards and alleys their whole-hearted cooperation was won.

As far as methods of operation are concerned, it should be mentioned that passengers on local buses do not have to transfer to the express trains if they do not so desire.

This whole development in Detroit's downtown area is of particular interest at the present time in view of the current theory that coordination of bus and trolley service should be of such a nature as to confine the buses to outlying districts and to the servicing of areas under development. The success with which the system is meeting on Jefferson Ave. will probably result in its adoption on other Detroit Street Railway lines, and it is understood that a number of surface transportation companies in other cities are following the development with interest.

IN Austria car imports are still controlled by a quota system. In 1926 the quotas of England, France, Italy, Belgium and the United States were 300 cars each but only France, Italy and the United States completely filled their quotas, whereas England, Belgium, Hungary and Czechoslovakia were either unable to sell or to supply the number of cars which their quota permitted them to import into Austria.

Parts and Shop Equipment Shows Find Trade Optimistic

Manufacturers pleased with business outlook after exhibits at Chicago and Cleveland. Service campaign bearing fruit. Makers of small tools prospering.

By Norman G. Shidle

SATISFACTORY business for 1928 in most parts and shop equipment lines and considerably accelerated activity in many is indicated by the experiences and opinions of prominent manufacturers in this field gathered in the last two weeks at the Automotive Equipment Association show in Chicago, Nov. 7-12, and at the National Standard Parts Association show in Cleveland, Nov. 14-19.

The continued efforts of manufacturers, the business press and of the various associations in recent years, not only to emphasize the overwhelming importance of service in the future automotive picture, but also to devise and put into action definite means of achieving more satisfactory and more profitable service, give every evidence of reaching fruition as the industry closes its 1927 campaign.

In the small tool field, for example, new merchandising ideas, increased marketing activity and concentrated sales effort are producing a condition of relative prosperity for many manufacturers in this line that cannot be denied. One manufacturer at the Chicago exhibit, for instance, on the fourth day of the show had done enough business to keep his factory working practically at capacity throughout the rest of this year and into the early part of 1928. Other small tool makers also reported exceptional jobber interest.

Aiding the Jobber

And none of the makers are sitting back with the slightest complacency nor feeling that goods sold to the jobber are completely sold. They are carrying forward as vigorously as possible all of those activities which have been common in the past to help the jobber move the material into the hands of the service station men and dealers who will use it; several manufacturers of small tools, as a matter of fact, are urging strongly upon jobbers the desirability of sending salesmen out with a cabinet of tools on the back of cars and are providing cabinets specially designed for the purpose. Other new selling ideas as well as being added to those already in common operation.

But the small tool makers aren't to have any monopoly of prosperity in 1928, if a summary of executives' opinions at these shows may be taken as an accurate gage of the future. Replacement parts manufacturers see a big year ahead, whether car sales mount to new high totals or not. The replacement market, they point out, will be larger in 1928 than ever before and the possibilities of making real profits from maintenance work are better recognized. These factors alone, they argue, will assure relatively good replacement parts business and profits during the 12 months that are to come.

In this connection, several makers point to the experience of Ford dealers during the past year as having a definite bearing on the future of service activities. Having no cars to sell for many months, they point out, Ford dealers have been forced to study service merchandising methods in a way never before thought of. Many of them found it possible, through concentration on the selling as well as the mechanical phases of their service station work, to keep themselves alive and even in some cases to make a bit of profit solely through this end of their business. The result has been, it is asserted, the most practical demonstration of service selling possibilities ever given to the industry.

Greater Interest in Service

Consequently, next year, when Ford dealers have money brought in through the sale of their new cars, it is reasonable to believe that they will be more interested in service station equipment and its application to their service work than ever before, while the influence of the Ford dealer experience as regards service on all dealers and service stations probably will not be small.

Throughout the exhibits in both of the shows and through the thoughts of various executives ran a clear recognition of the importance of the merchandising abilities and marketing power of the manufacturing organization in addition to the quality of the product itself. The sales background and study of marketing facts and methods are being urged more strongly by individual manufacturers every day as a reason for handling their particular products.

Throughout the accessory divisions of the A.E.A. show the development of artistry and beauty in design was quite evident. The tendency to build accessories with special reference to their appearance when incorporated with particular car designs is now common.

Slight discouragement on the part of some companies and the existence of a relatively quiet market in some quarters peeped out from the general sheen of optimism which radiated from the exhibitors at the shows, but the general picture unquestionably is bright.

Decision to go forward with the work of the Greater Market Development campaign was, of course, the outstanding feature of the Automotive Equipment Association activities.

The National Standard Parts Association's third annual show opened at the Public Auditorium in Cleveland with approximately 150 members exhibiting.

Outstanding in the exhibits was the evident effort that manufacturers have made to simplify the stock keeping problems of the retailer. To this end the manufacturers of electric cables are making one universal cable that will serve well as replacement on many cars. Another manner in which this problem of reducing the retailer's stock is being worked out is by maintaining ample stocks of all parts in convenient locations so that it is possible to get quickly any replacement part that may be needed.

Actual demonstrations were made to show the operation of cylinder reconditioning equipment, valve service tools, and in fact most of the tools on display. In a similar manner the salesmen in the replacement parts booths were prepared to show definitely why certain parts are best for certain service.

Recognizing the impossibility of housing under one roof the entire convention and show, the board of directors decided on the Hotel Hollenden for the convention headquarters and the public auditorium for the show. The two locations are only three minutes' walk apart.

A total of 30,000 sq. ft. of space in the auditorium—divided into 190 booths—was taken by the exhibitors.

According to E. P. Chalfant, executive vice-president of the association, the association has a roster totaling 297 members. This high mark in membership was reached last week when 11 new manufacturer members were admitted by action of the executive committee at Detroit.

Engines Designed to Give Gases Swirling Motion

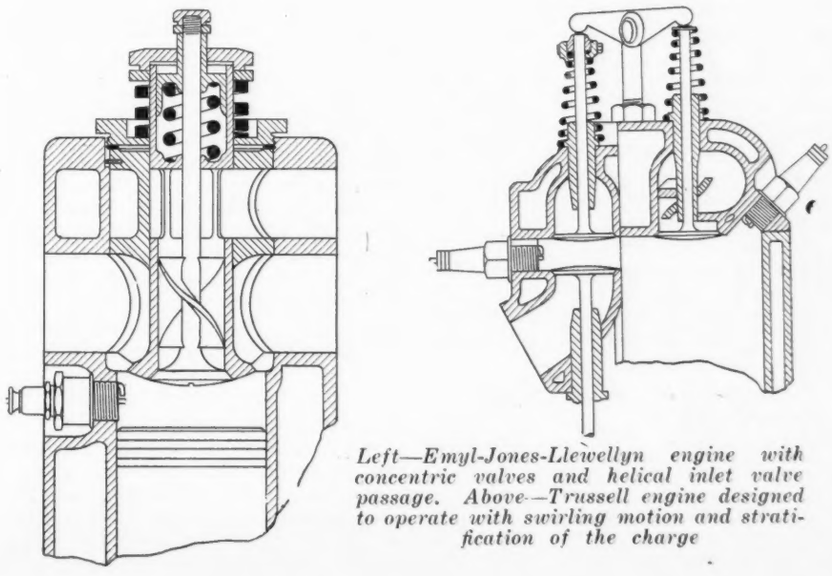
SEEING the popularity which turbulence-type of combustion heads have achieved, a number of inventors have been at work devising means whereby a swirling motion can be imparted to the gases as they enter the cylinder. Homer A. Trussell of St. Louis, has recently been granted a U. S. patent (No. 1,643,396) covering an engine in the design of which both stratification and a swirling motion of the charge are aimed at.

As may be seen from the drawing reproduced herewith, the Trussell engine is of the L-head type, having an inlet valve directly above and in line with the exhaust valve. There is an additional inlet valve in the cylinder head, and in the head above this valve there is formed a pocket from which there is a passage into the combustion chamber, ending in the throat of the valve, in which there is a helical guide or deflector for the incoming charge.

Two carburetors are to be used, one connecting to each of the inlet valves, and one carburetor may be set to feed a leaner mixture than the other. The passage from the valve chamber at the side into the combustion chamber is arranged tangentially, so the mixture entering the combustion chamber from this pocket also will assume a swirling motion, and in the inventor's opinion any residual gases will collect at the center of the cylinder and be surrounded by a layer of fresh gases. Two spark plugs are provided, located in the combustion chamber wall and the wall of the pocket respectively. Thus the charge in the pocket is fired separately, and as the burning gases escape from the pocket on the descent of the piston they are given the same sort of swirling motion as the fresh charge on entering the combustion chamber.

It is planned to introduce a rich charge into the combustion chamber through the side pocket, and a leaner mixture or air only through the valve in the head. There would then always be an ignitable mixture in the side pocket. In order to reduce the power of the engine, the rich mixture entering through the side pocket is throttled, while the charge of air or very lean mixture entering through the valve in the head is not varied. This results in maintaining the compression and the thermal efficiency.

A valve mechanism embodying the use of helical deflectors in the valve passage has been patented in England by E. J. Emyl-Jones and B. T. Llewellyn (No. 276,189). The inlet valve is housed within the hollow stem of the exhaust valve and helical baffles are provided to produce a vortex action in the incoming charge, which is claimed to help with the scavenging. Induction takes place through the ports while the exhaust gases escape through the passage. The whole assembly of valves is mounted in a cage and can be withdrawn bodily from the cylinder head.



Left—Emyl-Jones-Llewellyn engine with concentric valves and helical inlet valve passage. Above—Trussell engine designed to operate with swirling motion and stratification of the charge

In the past there has been a good deal of trouble from over-heating of exhaust valves mounted in cages, but this probably would not have to be feared in this design, because the incoming charge passing through the hollow stem of the exhaust valve would carry with it a great deal of heat. But the exhaust valve would certainly be much heavier than one of conventional design, and the engine therefore would hardly lend itself to high-speed operation. Several manufacturers of automobile engines have used such concentric valves in the past, on account of the possibility of securing large valve opening areas without materially extending the head beyond the circle of the cylinder bore, but these valves were always given up because of difficulty in making them sufficiently quiet.

AUTOMOTIVE NEWS SECTION INDUSTRIES

Philadelphia, Pennsylvania

November 19, 1927

Plants Prepare for 1928 as Dull Season Continues

PHILADELPHIA, Nov. 19—Automobile manufacturing activity is currently mainly concerned with preparations for the 1928 market. With sales slack just now there is plenty of opportunity at the plants for revamping of assembly lines, installation of new equipment, taking of inventory and laying of merchandising campaigns which will be launched at about the time of the national automobile shows.

There is a very general belief that 1928 will be a big year for the industry, based on the conviction that the announcement of the new Ford will release a buying demand long held back. By the same token, however, there is no disposition to believe that sales will be easier to gain next year than they have in 1927 and a period of even stiffer competition is anticipated. Numerous overt moves to meet the Ford challenge are being rumored but confirmation is lacking.

With virtually everything known about the new Ford so far as general mechanical specifications are concerned, executives in other companies have been given a good deal of time to lay their plans for next year. The exact price of the new car of course is still a secret but most observers believe they can come close to an accurate estimate.

Raskob Sees 1928 Output Increased to 5,000,000

NEW YORK, Nov. 18—Leaders in the automotive and financial world were guests of John J. Raskob, vice-president of General Motors Corp., at a dinner given to E. R. A. Seligman, professor of political economy at Columbia University, at the Ritz-Carlton Hotel last night. At the dinner Professor Seligman outlined the results of his recently completed study of the effects and conditions surrounding instalment selling.

In introducing Professor Seligman, Mr. Raskob said everything indicated that 1928 will witness the greatest prosperity the United States has ever enjoyed. With Ford in production, he said, the automotive industry will produce 5,000,000 units as against 3,600,000 this year.

Auburn to Double Output

AUBURN, IND., Nov. 15—Sales by Auburn Automobile Co. in October were 10 per cent larger than for the last three months of 1926 combined, reports N. E. McDarby, sales manager. During the month 58 new dealers were signed, and five distributors in the domestic territory and six in foreign territory. Parts commitments for 1928 now placed call for double the production of 1927.

G.M.C. Sales Pass Billion in 9 Months

NEW YORK, Nov. 17—Net sales of General Motors Corp. in the first nine months of 1927 totaled $1,028,131,492 as against $829,449,652 for the same period last year, an increase of about 24 per cent. This was the first time the corporation sales had crossed the billion mark in a nine months' period. Sales in the full year totaled $1,058,153,338.

Net sales for the third quarter were the highest for the period totaling $347,512,013 against $294,374,865 in the 1926 quarter.

Current assets at Sept. 30 totaled $418,624,360 against $336,338,213 at the end of 1926. Current liabilities were $135,141,668 against $144,332,596. Sales to users in October totaled 153,833 as against 132,596 in September and 99,073 in October, 1926. Sales to dealers totaled 128,459 as against 140,607 in September and 115,849 last October.

Chrysler Profits Rise 38 Per Cent Over 1926

DETROIT, Nov. 17—Chrysler Corp. reports net profit of $16,221,886 for the first nine months of 1927, comparing with $11,719,812 in the same period of 1926, an increase of 38 per cent. This is equal to $5.50 a share on common as against $3.95 for the 1926 period. Net for the third quarter was $6,105,136 against $5,724,180 in the second quarter and against $3,873,608 in the third quarter last year.

The balance sheet as of Sept. 30 showed net current assets of $42,272,999, of which $31,737,050 was in cash and securities, against $36,557,314 on June 30 and $27,981,575 on Sept. 30, 1926.

Merger Story Brings Denials

NEW YORK, Nov. 17—Reports of a merger which W. C. Durant, president of Durant Motors, Inc., was declared negotiating with six other companies, Hupp, Chandler, Peerless, Moon, Gardner and Jordan have not been borne out by developments of the week.

52,285 Vehicles Use Tunnel on First Day

NEW YORK, Nov. 16—Reports made to the New York & New Jersey Tunnel Commission showed that in the first day's operation, Sunday, 52,285 vehicles passed through and paid tolls of $26,000.

On Monday traffic between midnight and 4 p. m. totaled 10,555 vehicles, of which about 40 per cent was commercial traffic.

Ventilation continued to be satisfactory. The carbon dioxide indicator registered a maximum of only one-half of one part to 10,000 parts of fresh air, a lesser ratio than on Sunday when the steam of cars was continuous.

Robbins Named President of General Cable Corp.

NEW YORK, Nov. 16—Walter Robbins has been elected president of the new General Cable Corp., and Joseph W. Marsh, chairman of the board. Other officers named at the first meeting of the board of directors were W. C. Hall, treasurer; G. C. Thompson, controller; G. K. B. Wade, special signing vice-president; A. A. Cook, general counsel, and H. T. Dyett, W. F. Field, G. A. Jacobs, P. H. W. Smith and Roger Strauss, vice-presidents.

The directors are C. Albrecht, H. W. Barnard, F. H. Brownell, H. T. Dyett, W. F. Field, E. A. Fish, S. L. Fuller, W. C. Hall, C. D. Hilles, G. A. Jacobs, C. J. Marsh, J. W. Marsh, C. M. Miller, F. M. Potter, Walter Robbins, P. H. W. Smith, and Roger Strauss.

Elects Two Directors

NEW YORK, Nov. 17—G. A. Brownback and Livingston Platt have been elected directors of the Moto Meter, Co., Inc., succeeding G. P. Braun and E. V. Hennecke. Mr. Brownback has been elected director of the company's subsidiary, the National Gage & Equipment Co. Henry Ervin has been elected vice-president and director of the Moto Meter Co. of Canada, Ltd.

M. F. Carr Named President

CAMBRIDGE, MASS., Nov. 12—At a recent meeting of the Carr Fastener Co., M. F. Carr was elected president, and Lewis F. Prouty, treasurer. Mr. Carr succeeds to the position left vacant by the recent death of F. S. Carr, who was president for some years.

Car Excise Included in $300,000,000 Cut

Ranking Republican Says Bill Will Include 1½% Drop for Corporations

WASHINGTON, Nov. 17—The complete and final repeal of the 3 per cent excise tax on automobiles was urged on President Coolidge today by a delegation of leading automobile manufacturers representing, they told him, not only the industry but the 22,000,000 automobile users of the country.

In the delegation were Roy A. Chapin, Alvan Macauley, W. Ledyard Mitchell, A. R. Erskine, H. H. Rice, John N. Willys, W. T. Waterfall, Charles W. Nash and Alfred Reeves.

WASHINGTON, Nov. 15—The tax cut which the House, Ways and Means Committee is arranging will be about $300,000,000 according to Congressman W. C. Hawley, of Oregon, ranking Republican member of the committee. This is about $75,000,000 more than recommended by Secretary Mellon and includes the abolition of the 3 per cent excise tax on automobiles.

Estimates of other reductions by Mr. Hawley are:

Reduction of the corporation tax from 13½ to 12 per cent, a cut in income from this source of about $140,000,000.

Abolition of the admission taxes, except those on prize fights and other luxurious sporting events, a reduction of about $28,000,000.

Abolition of the stamp tax on documents, etc., reducing income by $25,000,000.

With the $66,000,000 lost by the abolition of the automobile tax, these total about $259,000,000. Another $40,000,000 will be cut from income in the House bill when it is completed, but Mr. Hawley said it was not yet clear who would get the benefit of this further reduction.

Champion Will Filed

DETROIT, Nov. 17—By the terms of the will of the late Albert Champion, his wife, Edna Crawford Champion, will receive his entire estate should she survive him by 30 days. B. W. De Guichard and the Detroit Trust Co. are named special administrators of the estate.

Three Companies Merge to Form Diamond Parts

CLEVELAND, Nov. 15—Announcement has been made of the merger of the Diamond Motor Parts Co., St. Cloud, Minn., manufacturer of piston pins, bolts, bushings and water pump parts; Gill Mfg. Co., Chicago, manufacturer of piston pins, and the Schlieder Mfg. Co., Detroit and Milford, Mich., manufacturer of valves. The merged company is known as the Diamond Parts Co. and headquarters are at St. Cloud, Minn. The officers are George Bouthinon, president; Elmer J. Smith, vice-president; Frank Maxham, treasurer, and V. W. Schlieder, secretary.

Fred Diehl Resigns Ford Buying Post

DETROIT, Nov. 17—F. H. Diehl has retired as purchasing agent of the Ford Motor Co. Mr. Diehl is the second major executive to leave the Ford organization in two weeks, the other being W. A. Ryan, who retired as general sales manager and who has been succeeded by F. L. Rockelman. It has not been learned who is succeeding Mr. Diehl, nor has Mr. Diehl announced plans for the future.

The company is sending bulletins to dealers notifying them that an elaborate campaign of colored window posters are being prepared and will be placed in their hands for use in announcing the new car. The company as yet has not given dealers an idea of when they will be ready. Reports in Detroit are to the effect that the company is now building about 30 complete automobiles a day. These are being shipped to more remote parts in preparation for stocking dealers with at least one sample when the car is announced.

Edsel Ford has announced that the company will build a $1,000,000 plant at Yokohama, Japan, to be ready about next August. It will have a capacity for 200 cars and trucks daily.

To Use Sparton Horns

JACKSON, Nov. 15—The Sparks-Withington Co. has a contract to provide the horn equipment for the new Ford cars, it was revealed today.

New Officers Are Named for American-LaFrance

NEW YORK, Nov. 16—Following the authorized increase in the number of directors of American-LaFrance Fire Engine Co., Inc., from 11 to 15, four new directors have been elected representing the recently acquired Foamite-Childs Corp. They are W. L. Geddes, F. J. Maginniss, W. J. Childs and F. M. Walters. W. J. Childs has been elected executive vice-president; F. M. Walters, vice-president; O. M. Canter, treasurer, and F. R. Van Rensselaer, secretary.

To Sell Stewart Trucks

DETROIT, Nov. 17—The American-LaFrance & Foamite Corp. has consummated an arrangement with the Stewart Motor Corp., for the sale and service of Stewart trucks through American-LaFrance branches. Heretofore, American-LaFrance, in addition to its line of fire engines, has specialized in heavy-duty trucks.

Business in Brief

Written exclusively for* AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co.

NEW YORK, Nov. 17—In the financial community the redemption on Tuesday of almost $750,000,000 Second Liberty Loan bonds has been the outstanding occurrence of the week. October sales of 32 chain stores were 11.56 per cent larger than a year ago. Consumption of lint cotton during October amounted to 2.3 per cent less than in the same month of 1926. During the past week retail trade has been stimulated by colder weather, while fundamental industrial conditions have been bettered by the placing of orders by certain railroad and oil companies.

FREIGHT CAR LOADINGS

Railroad freight car loadings in the week ended Oct. 29 declined, numbering 1,112,621, as compared with 1,128,486 in the previous week and 1,208,878 in the corresponding period a year ago. Total loadings so far this year amount to 44,459,425 cars, as against 45,101,712 in the same period last year and 43,430,103 two years ago.

PETROLEUM OUTPUT

Production of crude petroleum again registered a decline during the week ended Nov. 5, average daily output for that period being 2,453,450 bbl. which compares with 2,466,550 bbl. a week earlier and 2,357,050 bbl. in the corresponding period a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices rose to 145.7 last week, as against 145.2 in the previous week and 146.2 four weeks earlier.

BANK DEBITS

Bank debits to individual accounts, as reported to the Federal Reserve Board for the week ended Nov. 9, were 18.6 per cent smaller than in the preceding week and 3.8 per cent greater than the amount reported in the corresponding period of 1926.

FEDERAL RESERVE REPORT

For the same period the Federal Reserve banks reported that reserves declined $25,200,000. Discounts rose $81,400,000, open market purchases $1,800,000, U. S. Government securities $3,800,000, note circulation $17,600,000 and total deposits $19,000,000. Member bank loans and discounts rose $54,448,000, investments $23,701,000, net demand deposits $66,928,000 and borrowings from the Federal Reserve banks $78,427,000.

Time money and commercial paper rates were fractionally lower last week at 3¾ to 4¼ per cent and 3¾ to 4¼ per cent, respectively.

France Votes Air Credit

NEW YORK, Nov. 14—Credit of 120,000,000 francs (about $4,800,000) for an airplane line between France and South America has been voted by the finance committee of the Chamber of Deputies.

Commerce Department Studies Used Cars From Dealer Angle

Information Will be Gathered in All Leading Centers and Report Made to Manufacturers—Principal Aim is to Benefit Dealers Abroad

WASHINGTON, Nov. 14—A nation-wide study of the used car problem has been started by the automotive division of the U. S. Department of Commerce. Its purpose, as explained by H. O. Smith, chief of the automotive division, is to "find the facts and let the industry apply the solution."

In scope the study will cover all of the principal automotive markets of the United States. During the past week a representative of the department visited Chicago, Cincinnati, Toledo and St. Louis, and next week will visit the dealers of Detroit, Cleveland and other central automotive centers. The study is being made under the personal supervision of I. H. Taylor, assistant director of the division.

The problem of used cars is being studied primarily from the viewpoint of the dealer—the man who must accept in trade the old car of the customer to whom he sells the new car. To hundreds of dealers the same questions are asked. What is your main used car problem? Has any plan in you city ever been devised for handling the used car problem? Assuming that a plan has been devised, what is the main, and what is the secondary reason for the plan's failure? As a practical problem, what is your solution?

Will Form Complete Picture

When all of the information that it is possible to obtain on the question has been correlated from the various automotive centers, it is the plan of the department to compile a report. Through the medium of this report, the picture of the used or trade-in car problem will then be presented to the automotive industry.

It is the department's expectation that while the study may be made of practical service to the 52,000 automobile dealers of this country, its greatest service will be for the benefit of foreign automobile dealers. "The automobile industry in most of the foreign countries both from a dealer's and from a user's standpoint is in its infancy," Mr. Smith declared. "It is the department's hope that we may give them the benefit of our errors and thus help them to avoid the pitfalls that the domestic dealers have encountered.

"The so-called used or trade-in car problem has made its appearance in practically every country where new cars are sold freely," Mr. Smith points out. "The car buyers who are responsible for the steady flow of new cars from the factories, the department classifies in two general classes: One class demands the latest and are willing to pay for the privilege if the old car is taken off of their hands. The other class is largely made up of buyers who limit themselves to the minimum outlay and confine their purchases to the smaller and less costly new cars or used cars which have been reduced in price far beyond the potential service taken out of the car, the department believes.

"In making this study, we do not expect to remedy the ills of the used car problem. All we can do is to find out the facts and the industry itself must apply the remedy," Mr. Smith declared. The department survey will not be completed, he said, for probably a month or six weeks.

Los Angeles Plant for G.M. Reported

LOS ANGELES, Nov. 15—General Motors Corp. is reported to have definitely determined to enter the southern California field with a large manufacturing plant. As preliminary steps toward this end, the company has secured options on two tracts of land in the Long Beach harbor district. One of these sites contains 350 acres and the other 600 acres. Purchase of one of these sites outright is expected to be closed before the first of the year by General Motors, and the local factory, it is stated, will have approximately 12,000 men employed within two years. The factory will be utilized for the manufacture of Chevrolet cars and Frigidaire it is reported.

In connection with the deal, it is also reported that Albert Kahm of Detroit is already preparing preliminary plans for the factory.

The proposed site of the new General Motors plant will be near the new plant of Ford Motor Co. in the harbor district.

Shanghai Imports 112

WASHINGTON, Nov. 15—A total of 112 passenger cars and trucks were imported into Shanghai, during the month of September, according to a report to the automotive division of the Department of Commerce. Of this total, the United States supplied 78 passenger cars and seven trucks.

Patents Aviation Sextant

BERKELEY, CALIF., Nov. 12.—Dr. H. B. Kaster, assistant in astronomy and ensign in the Naval Reserve at the University of California, has patented an instrument to replace the sextant in aerial navigation. The device automatically eliminates mathematical calculation in the computation of an airplane's or a ship's position. The instrument has been tried out with success on a destroyer. The university has been given a half-interest in the invention by Dr. Kaster, and approval placed on it by a commission consisting of Dr. W. W. Campbell, president of the university; Capt. C. W. Nimitz of the Naval R. O. T. C.; and Professors A. O. Leuschner, S. Einarsson, A. C. Alvarez, and L. B. Loeb, of the science department.

New England Flood Severe on Highways

BOSTON, Nov. 14—Highway damage in New England as a result of the flood starting in Vermont will run into millions, it is now estimated. Vermont's bill for reconstruction work will be about $1,000,000, it is believed. This will not be finished finally for more than a year, it is expected. Some of the main roads were washed away. The number of bridges will pile up the total more than can be estimated now. This may reach $500,000 more.

In New Hampshire the highways were flooded along the Connecticut River, and further inland other sections were under water as a result of the excessive rains. It is believed that the cost to the highways in New Hampshire will be at least $250,000.

In Massachusetts the greatest damage was done in the Berkshires. Commissioner William F. Williams, of the Department of Public Works, in a statement issued a few days ago said that the lowest cost for repairs at this time looked to be about $250,000. However, there will be further strengthening of bridges necessary, it is believed, that will jump this cost up.

In Connecticut the flood did not go on a rampage as many feared. The crest was felt before the Connecticut line was reached. But some of the highways were overrun by the overflow.

Postal Receipts Lower

WASHINGTON, Nov. 14—Postal receipts in the 50 leading cities of the United States, as indicative of general business conditions, showed a decrease of 1.25 per cent in October compared with October, 1926. The receipts in October this year were $32,449,638 in the 50 largest cities. Of the list of 50 cities, 29 showed a decrease and 21 an increase, the largest increase being at Memphis, Tenn.

Adds New Compressors

CLEVELAND, Nov. 14—The Service Station Equipment Co. of Bryan, Ohio, has announced a line of ECO medium heavy-duty air compressors. Two new products have also been added to the ECO line of air service stations.

Ayres Review Sees Demand Gathering

Says Production Must Start Soon—Conditions Against Protracted Decline

CLEVELAND, Nov. 14—Optimism runs through the November edition of the Cleveland Trust Co. bulletin edited by Col. Leonard P. Ayres, part of which is reproduced as follows:

"Shortages are in the making in iron and steel, automobiles and railroad equipment. In these important lines production has fallen below normal consumption, and there are no large stocks from which consumption can draw. This means that before long production must start up again, for buying demand is surely accumulating.

"The condition is unusual. In the past, downward swings of important items of industrial production have usually followed inventory accumulation periods, induced by advancing prices. But during this year, wholesale price trend until recently has been a declining one for most commodities. As a result there has been but little accumulation of speculative inventories, and so the current low rates of output mean that shortages are developing rather than that surpluses are being worked down.

"The general situation may be summarized by noting that business is slowing down under conditions that make it appear much more probable that it will in the not far distant future increase its activity again than that it is likely to continue into a protracted decline. Consumption continues on so great a scale that it promises to require increased output before long in view of the fact that there are no important stocks of goods to be worked off."

Colonel Ayres does not fear any wide swing from prosperity to depression, because of "vast and flexible credit supply, and the efficiently and smoothly operating Federal Reserve System."

Boosters Arrange Party

DETROIT, Nov. 14—The Automotive Boosters Club of Detroit is planning a celebration for Dec. 2. The affair, which will be the most pretentious put on by the Detroit club, will be held in the private dining room of the Savoy Hotel and the membership is planning on entertaining a large number of guests.

Flint Wheel Plant Sold

FLINT, Nov. 14—A large portion of the Kelsey-Hayes Wheel Co. plant here, has been purchased by the Peninsular Milling Co. The plant originally was operated by the Imperial Wheel Co. and several years ago was sold to the Hayes Wheel Co. and soon after was closed. The Peninsular Company will use it for flour and grain storage.

Durant Organizing Chain Store System

SEATTLE, Nov. 14—A new and distinctive type of organization in the automobile industry is rapidly assuming sizable proportions, so far as Seattle is concerned, with the completion and opening of a new semi-independent branch of the Durant Motor Co. of California at 5451 Leary Ave. The opening of this store completes the establishment here of a "chain store" and "mother" warehouse system along identical lines with that being adopted in every Western state, and following a policy which it is declared will later become that of Durant Motors throughout the country. W. A. Wallace is in charge of the "chain store" here.

Maryland Considers Car Inspection Law

BALTIMORE, Nov. 16—Efforts are to be made at the next session of the Maryland General Assembly to pass a law which will make it compulsory for motorists to have their cars inspected. E. Austin Baughman, state motor vehicle commissioner, and John N. Mackall, chairman and chief engineer of the Maryland State Roads Commission, are in favor of such a law and it is expected that they will ask the next Legislature to enact a measure. Mr. Baughman advocates an inspection every six months and Mr. Mackall favors an annual inspection.

The Save-A-Life campaign conducted in Maryland from Oct. 24 to Nov. 12 showed that a great many automobiles were being operated with faulty brakes and other defects. This fact has caused the officials to believe that a compulsory inspection law would be beneficial. It is estimated that about 70 per cent of the owners had their cars inspected during the campaign.

Sign Kissel Franchise

HARTFORD, WIS., Nov. 14—Three new distributors have been added to merchandise Kissel automobiles in New York City, St. Louis and San Francisco, reports W. L. Kissel of Kissel Motor Car Co. Foster Motor Co., Inc., St. Louis, with F. J. Foster as president, has added the Kissel and will open a special showroom about Nov. 20. John G. Dale, one of the founders of the old Simplex Motor Co., who for the last several years has been Cunningham distributor for New York and vicinity, will open a new showroom at Fifty-seventh St. and Park Ave., and Lloyd S. Johnson, who for 15 years had distributed Duesenberg in San Francisco, has added distribution of the Kissel for northern California.

Sloan Says Germany Taking Most Cars

Country is General Motors Best European Market—U. S. Outlook Improved

NEW YORK, Nov. 14—Alfred P. Sloan, Jr., president of General Motors Corp., on returning yesterday from Europe, said that 1928 should be a banner year in the motor industry. He said that buyers who have been holding off for the appearance of the new Ford car will soon be in the market, and he looks for a substantial increase in all General Motors units next year. He added that the corporation's earnings this year should live up to estimates already made, as between $223,000,000 and $225,000,000.

Foreign business is good, Mr. Sloan found, and General Motors is selling more cars in Germany than in any other European country. He sees no prospect of a recession. He added:

"In America the used car situation is one of the greatest problems facing the industry, and its proper solution rests upon a better understanding between dealers. When ways and means are worked out satisfactorily the automobile industry as a whole will be greatly benefited. General Motors anticipates no new developments in the industry and so far as our own policy is concerned we have no new plans in view."

Tariff Increase Proposed

NEW YORK, Nov. 14—Several American automobile manufacturers are threatened by the German government's proposal to increase the import duty on automobile parts shipped into Germany for assembling.

The upward revision will particularly affect manufacturers who have assembling plants in German territory. Heretofore automobile parts have been subject to an average rate of from two to 20 marks. It is now proposed to raise the duty to 150 marks.

It is estimated that five American automobile firms employ 2500 German workmen.

Peugeot Gets Swiss Plant

WASHINGTON, Nov. 15—The Peugeot Automobile Co. has concluded negotiations for a three-year lease of the Robert Bell foundry at Torrentruy, Switzerland, for assembling automobiles, the U. S. Department of Commerce is advised. The Switzerland plant is now being rebuilt and will be used for assembling and manufacturing automobiles and spare parts in Switzerland. The opening up of the Swiss plant is due, the department is advised, to the increased tariff effective Nov. 1.

Opens 45 Dealerships

SPOKANE, Nov. 14—The National Lead Battery Co. has established 45 dealerships in the Inland empire.

Men of the Industry and What They Are Doing

Saunders Jones is Named Assistant to W. C. White

Saunders Jones, formerly vice-president of the southern region of the White Co., with headquarters at Atlanta, has been transferred to the Cleveland office where as vice-president "he will act as assistant to the president and have all the authority that goes with such a position." Walter C. White, president, announced. Mr. Jones started with the concern as salesman in the Dallas branch and later became branch manager at Nashville, then vice-president of the western region at St. Louis. From there he succeeded to the Atlanta post. C. B. Cowan, Birmingham district manager, will take Mr. Jones' place in Atlanta, pending the appointment of a vice-president.

Rautenstrauch Goes Abroad

Walter Rautenstrauch, president of Splitdorf Bethlehem Electrical Co. and Splitdorf Radio Corp., has gone to Europe on a month's trip to deliver a series of lectures and study conditions abroad. Mr. Rautenstrauch was invited to speak before various organizations on industrial topics.

Willys Guest of Honor

John N. Willys, president of the Willys-Overland Co., and a native of Canandaigua, N. Y., will be guset of honor at the annual dinner of the Society of the Genesee at the Hotel Commodore, New York, on Jan. 23, 1928, according to an announcement made by officials of the society here.

Ternstedt Promotes McPhail

J. H. McPhail has been appointed sales manager of Ternstedt Mfg. Co., and W. A. Maher has been named assistant sales manager, the appointments being made by Thomas P. Archer, president.

Perkins Joins Murray

H. G. Perkins has been appointed assistant works manager of the Murray Corp. of America. Mr. Perkins is well-known in the industry having been connected with the Chrysler Corp. for six years as an industrial engineer.

Johnson Represents Fair

Herbert A. Johnson has been appointed New York manager of the Leipzig Trade Fair, Inc., in which position he succeeds E. A. Boettcher. Headquarters continue at 630 Fifth Ave.

Harrington Goes Abroad

N. T. Harrington, secretary and general manager of the Simplex Piston Ring Co. of America, Inc., accompanied by his daughter, has sailed for Europe where he will visit England, France, Austria and Germany, investigating markets for his company's products.

Booster Dust Cloth to Help Pay Bills

Automotive Booster Club, Missouri Valley No. 2, has arranged for the manufacture of a dust cloth to be placed on the market as the Booster Dust Cloth. Profits from the sale of the cloth will be used by the club in staging meetings in the Southwest in the interest of the organization. The dust cloth was selected as an item for manufacture because its sale would not conflict in any way with lines sold by members of the club, all of whom are representatives of automotive specialty manufacturers.

Appleby Leaves Standard Tube

Herbert Appleby, for the last two years associated with the Standard Tube Co., of Detroit, has resigned and will soon announce new connections which he is making with a Chicago company. Mr. Appleby has been in the automotive field for 14 years, but in taking up his new work will leave the industry.

Burgess in Flying Field

H. A. Burgess, who in the past 15 years has represented several automobile factories as coast wholesale representative, and at one time was wholesale manager of the Apperson Motor Car Co., Los Angeles, has accepted an appointment as manager of the Colorado division of the Western Air Express.

Fenner Named Delegate

D. C. Fenner, Mack Trucks, Inc., has been named as a delegate of the Motor Vehicle Conference Committee and the National Automobile Chamber of Commerce to the Southern Highway Conference to be held in Fort Worth Nov. 28, under the auspices of the Highway Club of Texas.

Shortal Joins Stearns

William G. Shortal, now assistant sales manager of the F. B. Stearns Co., will spend most of his time in the field. Mr. Shortal was with Pierce-Arrow Motor Car Co. and will aid Lawrence E. Corcoran, new Stearns general sales manager.

Snow Leaves Greenfield

Galen Snow has resigned as sales promotion manager of the Greenfield Tap & Die Corp., to become treasurer of William B. Remington, Inc., advertising agency, Springfield, Mass.

American Cars Dominant in Europe Says Moskovics

Returning from a several weeks' stay in Europe, F. E. Moskovics, president of Stutz Motor Car Co. of America, Inc., brings back two major observations, gained largely at the Paris and London shows. The first is that American cars have established a complete dominance in Europe and the second is that the flexible type of body, designed by C. T. Weymann in France, has gained such a vogue throughout Europe that its gain in favor in this country within the next few years is forecast.

"If there has been any question of the world supremacy of the American motor car, the great automobile shows in Paris and London have completely cleared up the point," says Mr. Moskovics. "In every country where duties are nearly even, the American car, in whatever price class it may be, is dominating sales, and the manufacturers of other countries definitely realize this. They are faced with a critical problem, now that American builders have accomplished precision of production and resulting performance that challenges the best in speed, stamina, ease of handling and other qualities that European cars have heretofore claimed largely as their own."

Mr. Moskovics' predictions regarding the acceptance of the Weymann type of body in this country were based on the fact that 60 per cent of all closed cars in Paris Salon had Weymann bodies, while the proportion of Weymanns at the Olympia show was 65 per cent.

Federal Promotes Shepherd

R. E. Shepherd, who has been connected with the Federal Motor Truck Co. of California, Inc., in Los Angeles, since the factory branch was opened here three years ago, was recently appointed sales manager.

Flynn Leaves Studebaker

Loren T. Flynn has resigned as experimental bus engineer from the Studebaker Corp. of America and has not announced his future plans. He was formerly connected with Yellow Truck & Coach Mfg. Co. and with the Buda Co.

Willems Goes to Australia

Following the completion of a successful tour of all European countries, E. G. Willems, export counsel and organizer of the export department of Franklin Automobile Co., is now proceeding to Australia, where he will establish new Franklin dealers.

De Causse Back From Europe

Frank De Causse, body designer of the Franklin Automobile Co., has just returned to the United States following a visit to the London and Paris shows.

Time Sales Rebates Branded Unethical

Finance Companies' Convention Condemns Practice—Cash Sales Show Increase

CHICAGO, Nov. 15—Rebates to automobile dealers on time sales transactions were vigorously denounced at the annual meeting of the National Association of Finance Companies which ended here today. The members and guests passed a resolution condemning the practice as unethical and uneconomical. Discussion of the question by various speakers revealed that the giving of rebates has been on the increase and forms a serious competitive disadvantage to the companies who refuse to follow the practice.

The discussion developed some differences of opinion as to what constituted actual rebates and what were legitimate reserves for the dealers' protection. Although the repossession ratio on new cars increased slightly during 1927, the average loss per repossessed car was smaller, according to figures presented by C. C. Hanch, general manager.

Another trend brought out and commented upon by several speakers was in the direction of a greater percentage of cash sales. New cars sold on instalments in 1927 were 58 per cent of the total sold, against 64 per cent in 1926. The proportion of irregular paper declined again in 1927, showing that so far as financing terms are concerned the business is on a sounder basis than ever.

Finance Company Bond Held Not Bank Asset

KANSAS CITY, KAN., Nov. 12—The Kansas Supreme Court has ruled that bonds issued by automobile finance companies cannot be listed by banks of the state as assets. The ruling was carried to the Supreme Court by the Security State Bank on an appeal from a ruling by Roy L. Bone, state finance commissioner, ordering the bank to withdraw from its listed assets a $5,000 "corporation gold note" of the General Motors Acceptance Corp. Examiners, in checking the bank, found the bond listed as an asset and refused to pass it. The finance commissioner upheld the examiner and the case was carried to the highest court of the state with the bank losing.

Aviation Handbook Ready

WASHINGTON, Nov. 15—The proposed Handbook for Commercial Airplane Designers which the Department of Commerce has prepared will be presented for consideration at the conference of representatives of civil aviation activities in Washington, Dec. 5. Sessions will be held during the week to consider air commerce regulations.

California Plane Brings Gold to Mint

SAN FRANCISCO, Nov. 14—The first bar of gold ever carried in an airplane from mine to mint was brought to San Francisco by John C. Benson, manager of the Demarest Mine, near Angels' Camp, Calaveras County, in a Pacific Air Transport plane, Nov. 7. The bar, worth $4,000. was delivered to Carl Jorgensen, president of the Bear Mountain Development Co., owner of the mine, at Mills Field, the municipal airport of San Francisco, and taken by him to the mint.

Sees Air Insurance Handled as Marine

PORTLAND, ORE., Nov. 12—The airplane has characteristics very similar to those of a deep sea vessel, and the insurance on this new mode of transportation as it grows will undoubtedly be handled by marine underwriters, said William Herron, vice-president of the Boeing Air Transport Co. at the Board of Marine Underwriters.

"It is a fallacy to believe that aviation is not a safe and economical medium of transportation. Out of millions of miles flown last year on air mail and commercial routes only one fatal accident occurred.

"The future of commercial aviation depends upon air mail. Without this patronage it will be impossible to expand present aviation facilities."

Pratt & Whitney Awarded $3,147,323 Navy Contract

WASHINGTON, Nov. 14—The Pratt & Whitney Aircraft Co. has been awarded a contract for 346 Wasp ninecylinder 400 hp. air-cooled engines by the Navy department. The contract value is $3,147,323. The newly purchased engines will be used in planes now under construction and which will be ordered to complete the aviation building program for the year.

Army Buys Eight Planes

WASHINGTON, Nov. 14—Eight cargo planes, having the equivalent carrying capacity of 10 persons were purchased this week by the War Department from the Atlantic Aircraft Corp. The total cost of the planes, including spare parts, aggregates $328,076. The unit cost of each plane is approximately $40,000.

Charles F. Atwood

GRAND RAPIDS, Nov. 12—Charles F. Attwood, president of the Attwood Brass Works, this city, died at the age of 70, Oct. 31.

Liability Insurance to Undergo Increase

Losses Due to Increased Awards in Personal Injury Cases Brings Rise

NEW YORK, Nov. 14—A country-wide upward revision of public liability insurance rates for private passenger cars will be put into effect at an early date, according to an announcement by the National Bureau of Casualty and Surety Underwriters.

The last rate revision of this character was made about two years ago. A recent survey by the bureau has revealed a heavy loss to the insurance companies in this class of business, due mainly to the tendency of juries to award increasingly large verdicts in personal injury cases. A slight increase in the number of accidents is also given as a reason for the change.

Not to Affect Massachusetts

BOSTON, Nov. 14—Motor Vehicle Registrar Frank A. Goodwin of Massachusetts has announced that as far as the Bay State was concerned the statement issued from New York, that the National Bureau of Casualty and Surety Underwriters would issue a country-wide revision of rates on privately-owned motor cars shortly, would not be effective. Mr. Goodwin pointed out that in Massachusetts the Compulsory Insurance Liability Law places the fixing of rates in the hands of the Insurance Commissioner, Wesley E. Monk.

Lelands Seek Payment for Lincoln Stockholders

DETROIT, Nov. 15—The long discussed suit of the Lelands, Henry M. and Wilfred C., on behalf of nearly 2000 stockholders in the old Lincoln Motor Car Co., against Henry Ford, was filed today in the Oakland Circuit Court at Pontiac. The suit involves $6,000,000 and is based on an alleged verbal understanding between Mr. Ford and the Lelands to buy in all outstanding stock at the time the Lincoln company passed to Ford Motor Co.

When Lincoln Motor Co. was sold at receiver's sale, the only bid was by Ford Motor Co. Two others who had qualified to bid by posting certified checks failed to make bids on the day of sale.

National Chromium Opens Plant in New York City

PHILADELPHIA, Nov. 14—In the story of the National Chromium Corp. establishing a modern chromium plating plant at 200 Varick St., New York, in last week's *Automotive Industries*, the head read General Chromium Opens Plant. This should have read National Chromium Opens Plant.

Willys Reorganizes Factory Sales Plan

Establishes Five National Zones With Managers Functioning From Home Office

TOLEDO, Nov. 14—Willys-Overland Co., under a new sales policy, will divide the entire country into five separate sales regions with a manager in complete charge of all Willys-Overland activities in each region. The purpose of the plan is to extend and ctrengthen the sales organization and bring about a closer contact between the factory, its branches, and the distributor-dealer organization. The new plan was announced by L. G. Peed, general sales manager.

The regions and the managers selected for each follow:

Eastern region, N. A. Beardsley, formerly manager of the Willys-Overland factory branches at Buffalo and Philadelphia; Northwest region, Verne Orr, formerly manager of the Chicago factory branch; Central region, A. E. Nafe, formerly special representative at the home office; Midwest region, E. D. Knowles, formerly regional manager in that territory for Star, and Pacific Coast region, Fred Coates, who rejoins the Willys-Overland organization after managing that region for Chevrolet.

All regional managers with the exception of the Pacific Coast manager, will maintain headquarters at Toledo, the plan giving the home office the services of four additional sales executives. Contact with the field organization will be through personal trips and through regional supervisors who will operate under them.

Wilson Foundry Resumes

PONTIAC, Nov. 14—The Wilson Foundry & Machine Co. has called 2500 employees back to work who were laid off a fortnight for a temporary curtailment of operations.

Kansas City High School to Teach Car Maintenance

KANSAS CITY, Nov. 14—Students in the Kansas City public schools soon will have the opportunity of learning to become automobile mechanics as a part of their regular class work. A course in automobile repairing is to be offered at the Northeast high school as soon as a shop to house the class can be completed. The shop is being built by students of Lathrop trade school. The course will not go into the finer details of automobile mechanics but students will be given a thorough course in the principles of automotive engineering and taught how to make all minor repairs. The shop will be equipped with lathes, milling machines, a shaper, drill presses, power back-saw, emery grinders, oxy-acetylene torches and forges.

South Carolina Adds 404 Miles of Highway

COLUMBIA, S. C., Nov. 14—In South Carolina, from Jan. 1 to Nov. 1, 1927, there has been built 404 miles of hard-surfaced highways, according to Ben. M. Sawyer, chief highway commissioner. This mileage was constructed at a cost of $10,087,256 or at an average cost of approximately $24,900 per mile as against an average cost in 1926 of $27,500 and an average cost per mile in 1925 of approximately $30,000.

These fine highways have been built in various parts of the state, they being in 22 different counties—there are 46 counties in the state.

Rubber Association Adopts New Samples

WASHINGTON, Nov. 15—The adoption of a new set of official type samples of crude rubber, to serve as a basis for transactions between sellers of rubber and American rubber goods manufacturers, by the Rubber Association of America, Inc., has been announced by the rubber division of the Department of Commerce. The department announces that the samples are identical with the new type samples recently adopted by the Rubber Trade Association of New York, except that they include also packing specifications. The department expresses the belief that a uniform international set of grades for rubber would be for the good of the entire rubber and automobile industries.

Wisconsin Tire Plants Maintain High Outputs

MILWAUKEE, Nov. 14—A survey of the tire industry in the Milwaukee district reveals an exceptionally active condition, contrasting with less favorable situations in other important producing fields. Ajax Rubber Co. operated at capacity of 5000 tires a day throughout October and expects to continue at this rate through November. The Federal division of Fisk Rubber Co. operating at 80 per cent, and the force is being increased for capacity operations by Dec. 1. The Horseshoe Tire Co. at Racine, is increasing its output from 60 per cent to 75.

Rubber Imports Higher

NEW YORK, Nov. 14—Crude rubber importations into the United States totaled 31,310 tons in October, 1927, as compared with 28,114 in October last year, according to the Rubber Association of America, Inc. The total for the first 10 months of this year was 362,693 tons against 337,952 in the corresponding period in 1926.

Waukesha Officials Form Day-Nite, Inc.

Company Will Build Headlight Testing Device and Provide Adjusting Service

WAUKESHA, Nov. 14—A new company has been organized here by executives of the Waukesha Motor Co., as an outgrowth of Nite-Eye, Inc., to be known as Day-Nite, Inc., devoted exclusively to solving headlight service station problems. Harry L. Horning, president of the motor company, is president; Chester S. Ricker, vice-president; S. A. Perkins, treasurer, and E. J. Lehnen, secretary and chief engineer. The principal product is the Day-Nite headlight testing photometer, invented and designed by Mr. Ricker.

President Horning, in discussing the new organization said:

"The Day-Nite headlight photometer is the first practical yardstick that has been devised for scientifically measuring headlight beams. By means of it, lights can be so set that they will not glare, and when so adjusted, should never have to be dimmed. Day-Nite stations in Wisconsin will be operated under the direction of the state industrial commission, which is charged with control of automobile lighting and setting up of standards. Testing will be free of charge. Our stations will expect compensation only for adjusting services and replacement parts.

"For two years, under the name of Nite-Eye headlight testing machines, the photometer has been tried out in a group of experimental stations to prove out the principle of legal photometric headlight testing. This year, after spending several months collaborating with Walter D'Arcy Ryan, director of the illuminating laboratory of the General Electric Co. at Schenectady, we have perfected a new and more scientific photometric machine for testing lights. Our program now is to furnish this machine to testing stations, cities and counties, through Day-Nite, Inc., and it will be called the Day-Nite Headlight Testing Photometer to distinguish it from the earlier Nite-Eye machine."

Triplex Glass Expands Factory to Meet Sales

NEW YORK, Nov. 14—Triplex Safety Glass Co., as a result of greatly increased demand for its product, is adding 21,000 sq. ft. to its manufacturing plant in Hoboken. This announcement was made at a luncheon last week on the occasion of the third anniversary of the founding of the company in America.

Triplex Safety Glass is now optional or standard equipment on a number of American and foreign cars and buses, while 1000 installations have been made by the New York branch alone. New business in Europe is causing enlargement of the British factory.

Carolina Bus Lines Now on Profit Basis

Deficit in 1926 to be Eliminated Through Discontinuance of Losing Lines

RALEIGH, N. C., Nov. 14—Bus lines in North Carolina with assets valued at $2,500,000, last year carried 2,500,000 passengers, took in $2,500,000, and spent $2,500,000 in operating expenses, it was revealed yesterday in the annual report on bus operations made public by R. O. Self, state bus director. The figures are in round numbers, but they represent the first comprehensive survey of bus operations in the state since this mode of travel leaped into vogue.

The report shows that today there are 85 passenger bus lines and 22 freight and express lines.

"The bus business for 1927," Mr. Self said, "is going to show an increase over last year. The revenue tax for the past 10 months of this year is equal to the tax paid for the entire year of 1926. It will be about $30,000 greater for the entire year."

The proximity of revenue and operating expense was caused, it was pointed out, by a number of small lines running into the hole and suspending operations, or being absorbed by larger companies. The tendency in the bus business still is toward consolidation, Mr. Self said.

Specifically, the figures on the bus business, which were compiled by E. L. Womble, corporation commission statistician, show:

Revenue: From passengers $2,406,971; freight, $140,217.61; miscellaneous, $54,578.38.

Operating expenses total $2,562,334, of which the principal items were: Gasoline and lubricants, $475,753; wages, $480,156; tires and tubes, $164,788; repairs, $184,990; insurance $100,522; injury and damage, $4,492, and revenue tax, $149,947.

Value of motor vehicles in operation was given as $1,418,280 and total assets as $2,466,537.

Forty-three lines showed an operating surplus totaling $104,048, while 24 lines showed an operating deficit of $65,043. Most of the lines showing deficits operated only a part of the year. Heavy outlay for equipment kept down income on all lines, but this is not expected to amount to such an item this year.

Oakite Holds Conference

NEW YORK, Nov. 12—Oakite Products, Inc., wound up a three-day sales conference for its field organization last night with a dinner at the Hotel Pennsylvania. C. L. Radley, advertising manager, was toast-master, and brief talks were given by D. C. Ball, president; Daniel C. Smith, vice-president, and A. W. Perry, field sales manager.

Rio Janeiro to Hold Races During Show

WASHINGTON, Nov. 15—A new departure in the holding of automobile expositions is announced by the Automobile Club of Brazil, according to dispatches received by the U. S. Department of Commerce. In connection with the 1928 automobile exposition from May 3 to 13 there will be automobile races daily, gasoline consumption tests and motor boat races in the bay. Among the different classes of products included in the exhibition are automobiles, motor boats, airplanes, road building materials, engines and accessories and all products relating to the automotive industry as well as bicycles and motorcycles.

Studebakers Set Up 25,000 Mile Record

WASHINGTON, Nov. 14—The establishment of a new endurance and speed record for stock automobiles has been announced by the American Automobile Association. The contest board of the A. A. A. announces in a test made under the supervision of its racing officials, three stock cars of the Studebaker Corp. of America, two sport roadsters and a sedan, traveled 25,000 miles at better than 60 miles per hour for the entire distance.

The cars started their grind on Oct. 18 and maintained better than a mile a minute for the 25,000 miles, the roadsters averaging 65.31 miles per hour. The sedan maintained a speed of 61.98 miles per hour. The cars in the contest were fully equipped stock cars regularly sold by the Studebaker corporation.

Universal Motor Moves

OSHKOSH, WIS., Nov. 14—The Universal Motor Co. is completing the removal of its plant and offices to its new building, erected and equipped at a cost of upwards of $150,000, and representing more than 100 per cent gain in area. The main building is 152 x 378 ft. The Universal company's business embraces customers in every civilized nation. Domestic and export orders on the books will require full capacity of the new plant for an indefinite period forward. E. H. Fahrney is president and general manager.

Whitaker Opens Branch

KANSAS CITY, Nov. 12—The Whitaker Battery Supply Co. of Kansas City has opened a branch in Philadelphia. The branch is in charge of Vic Brewer with four sales working out of the office.

Downtown Car Ban Proposed for Boston

Governor Fuller Advocates Action and Champions Rights of Pedestrians

BOSTON, Nov. 14—The question of barring passenger cars from the downtown streets in Boston has flared up again due to Governor Alvan T. Fuller advocating this procedure, at least between 10 and 3 each business day, while Mayor Malcolm E. Nichols takes a stand against it. At a luncheon of the governor's safety committee, Governor Fuller, in addition to the barring of motor cars, urged that the Boston police acquire a new viewpoint regarding the importance of the pedestrian and the motor driver. Among other things he said:

"Sometimes I have felt that a policy of reporting reckless driving might be put into effect so that private individuals could make reports that might be investigated. Then again I have thought that the newspapers might print the names of those who have lost their licenses, stating the cause.

"Something ought to be done in the congested area of Boston. The condition is ridiculous. It may well be that all pleasure cars should be barred from the downtown congested districts between 10 and 3. Buses could be provided for the feeble.

"The present situation where single individuals riding in spacious limousines pour through the Boston streets while hundreds of pedestrians are huddled on street corners, I repeat is ridiculous. For my business it might be better if everyone rode in motor cars, but I am considering the needs of the individuals irrespective of what transportation they use.

Police Favor Car Driver

"When it comes to crossing the street I think that a pedestrian should come nearer having the right of way. I am continually impressed as I walk around Boston with the fact that the average automobile driver has an exaggerated idea of his own importance and that to a certain degree this idea is shared by the police."

Mayor Nichols took a different view. He said under Governor Fuller's plan the business of downtown stores and shops would be substantially injured and very little would be accomplished for the pedestrian. He said further: "The only suggestion made by the Governor with which I agree is that the police need a new viewpoint regarding the comparative importance of pedestrian and automobile traffic. In a short time there will be a report prepared by a traffic committee I appointed to study conditions. It is headed by Dr. Miller McClintock, and when published should contain some worthwhile suggestions."

Automotive Buying of Steel Unchanged

Nothing Spectacular in Ford Orders to Date—Some Alloy Concessions Noted

NEW YORK, Nov. 17—Following almost simultaneous announcement of a gain in the leading interest's unfilled tonnage and of a $1 per ton advance in the price for heavy rolled steel products quoted by one of its subsidiaries, the steel market's undertone became somewhat less plastic than it had been recently. So far, however, there has been little actual change in the volume or character of automotive buying.

There is much talk of "very large Ford orders being not far distant," but what business can be traced as emanating from that quarter is so far utterly devoid of the spectacular.

Competition among sheet rollers continues keen, the strip steel market being fully as competitive in character, if not more so. The $1 per ton advance in hot-rolled steel bars so far has had no effect on the cold-finished product. Makers of secondary products appear at this time to be chiefly concerned with maintaining their rate of operations.

Slight concessions have been noted in recent small lot transactions in automotive alloy steels. Three per cent nickel steel bars (S.A.E. 2300) have recently sold at as low as $4 per 100 lb., Pittsburgh basis. Automotive buying of bolts and nuts is still on a hand-to-mouth basis, with prices fairly well maintained. It is certain that steel producers are eagerly awaiting the psychologically appropriate time for seeking more remunerative prices all along the line.

Pig Iron—Automotive foundries do not figure very prominently in the market just now. A slight improvement in sentiment has taken place, but so far this has not been translated into dollars and cents.

Aluminum—While aluminum imports during the first nine months of 1927 exceeded those of the corresponding period of 1926 by 6,000,000 lb. or about 12 per cent, this was caused by much heavier shipments from Canada, imports from Europe having, in fact, sharply declined. The recent sharp cut in the domestic producer's prices seems to have been more than met by importers. The "outside" market is ½ and ¾ c. under the quotations of the sole domestic producer.

Copper—At last the copper market appears to have negotiated the arduous upward climb from 13 to 13½ cents, delivered Connecticut or Middle West, and unless a relapse is suffered, the first sign of better demand will bring the 14 cent level into sight.

Tin—Better consuming demand is noted, and prices responded to this and better sentiment in London and Singapore.

Lead—The market is slightly firmer, with storage battery manufacturers showing somewhat more interest.

Zinc—While the market is a shade steadier, consumers are apathetic.

Synthetic Rubber Reported Developed

NEW YORK, Nov. 15—Development of a synthetic rubber that soon will be placed on the market was announced at a meeting of the German Chemical Manufacturers' Association at Frankfort-on-Main, according to word received here. Dr. A. von Weinberg reported a new catalyzer has been found that simplifies the uniting of the elements of rubber found in coal tar.

Tire Inventories Lower in October

NEW YORK, Nov. 15—Inventories of casings and tubes as of Oct. 1 showed sharp reductions from the month previous, and in the case of tubes were about 1,300,000 under the total of the same period last year. Casing inventory was about 300,000 larger than the preceding year. September production of casings showed a decline of about 700,000 from August and shipments were about 500,000 lower. Tube production decreased about 600,000 and shipments decreased about 900,000.

Production and shipment totals as compared with the same month last year showed sharp declines, particularly in tubes.

Comparisons follow:

	Inventory	Production	Shipments
Balloon Casings			
Sept. 1927..	3,927,917	1,807,924	2,132,318
Aug. 1927...	4,231,101	2,209,580	2,413,700
Sept. 1926..	2,949,531	1,968,229	2,090,799
Balloon Inner Tubes			
Sept. 1927..	5,152,658	1,599,987	2,046,955
Aug. 1927...	5,610,329	1,883,417	2,445,670
Sept. 1926..	4,318,512	1,956,234	2,128,619
High Pressure Cord Casings			
Sept. 1927..	3,151,501	1,755,119	2,051,117
Aug. 1927...	3,553,041	2,059,868	2,250,576
Sept. 1926..	3,459,221	2,246,111	2,581,574
High Pressure Inner Tubes			
Sept. 1927..	4,980,749	2,638,606	3,021,458
Aug. 1927...	5,367,289	2,976,292	3,541,012
Sept. 1926..	7,165,399	3,736,578	3,692,619

Michelin Prices Reduced

LONDON, Nov. 8 (*by mail*)—Concurrent with the completion of the new Michelin plant in this country and the beginning of production on a large scale, the prices of Michelin pneumatic tires were reduced 15 per cent, a reduction of 5 per cent applying to solids.

1370 Miles of Forest Road Added

WASHINGTON, Nov. 14—A total of 1370 miles of forest road was constructed in the national forests of the United States during the past fiscal year according to figures of the forestry service of the U. S. Department of Commerce. The total expenditure on forest road construction during the year was $7,715,535, of which $6,787,656 was paid with Federal funds, the remaining being paid through states, cooperative and counties assessments.

Automotive Division Outlines Year's Work

Inquiries During Year Total 214,806 — Has Improved Means for Collecting Data

WASHINGTON, Nov. 14—The growing volume of export trade of the automotive industry is reflected in the annual report of the automotive division of the U. S. Department of Commerce for the fiscal year ended June 30, 1927, just made to the Secretary of Commerce.

The report shows that during the year 214,806 inquiries in regard to foreign trade were answered by the division. In 1923, the first year for which figures are available, a total of 56,232 inquiries were answered. In 1924 this total had risen to 105,000, and to 181,000 in 1925. Based on the number of inquiries, the greatest interest was in 1926 when the total was 228,727.

In summarizing its work for the year, the division says that the two outstanding features of the year's work have been the marked improvement in the collection and publication, periodically, of data on foreign automobile registration, imports, exports and sales, and the progress made in developing greater interest among American aircraft manufacturers in the possibilities of foreign trade. Of secondary importance, is the appointment of special automotive trade commissioners to look after automotive matters, four having been appointed the past year, each in Europe, South America, New Zealand, and India.

Labor Department Sees Higher Operations Near

WASHINGTON, Nov. 17—Little change in employment conditions in the automotive industry, during October and the first two weeks in November, is reported by the United States Employment Service of the Department of Labor, in its regular monthly survey of employment conditions throughout the country. The industry as a whole is reported to be on a part-time basis, although the department reports that the time is close at hand when the industry will be operating on a very active basis.

Franklin Exports Higher

SYRACUSE, Nov. 14—Overseas shipments of the new Airman series cars for the month of November are expected to exceed all previous export records, according to Franklin Automobile Co. Since the exhibition of the new Franklin models at the Olympia show, an exceptional interest in this type of automobile has been evidenced by attending dealers from all parts of the world. Applications for franchises have been received from virtually every civilized country.

Production Session at Delco-Remy Plant

Indiana Section of S.A.E. Has Record Meeting—C. E. Wilson Reads Paper

INDIANAPOLIS, Nov. 12—The Indiana Section of the Society of Automotive Engineers production meeting held at Anderson, was the most successful production session ever held by the Hoosier engineers. About 100 of the Indiana section men from Indianapolis and other Indiana cities, and forty S. A. E. men from Detroit, Dayton and other "foreign parts" attended the morning and afternoon production inspection visits through the Delco-Remy plants.

The evening dinner staged at the Grand Hotel drew 200 guests who afterwards listened to C. E. Wilson, president and general manager of the Delco-Remy Corp., present his paper on the Delco-Remy production theory and setup on the progressive production methods used in armature building. The talk, which was illustrated by slides and by instruments in the various phases of production, was followed by a lively discussion.

The entertainment features of the visit were most adequately taken care of by members of the Delco-Remy engineering corps. During the morning and afternoon plant visits, designing engineers of various Delco-Remy plants, conducted small groups of visiting engineers through the three larger plants.

At a short business meeting following the dinner with George Freers, section chairman, presiding, the member and alternate to the S. A. E. nominating committee elected were: Dan Teetor, member, and F. F. Chandler alternate. Frank Preston of Delco-Remy was elected member of the standards committee.

Reinhart Coast Speaker

OAKLAND, CAL., Nov. 12—The Northern California Section of the Society of Automotive Engineers held its monthly meeting and dinner at the Athens Athletic Club here Nov. 10. H. A. Reinhart presented a detailed paper on Operation and Maintenance of Tractors under West Coast Conditions, and E. C. Wood reported the discussion of his paper on Maintenance and Operation at the October meeting in Chicago.

Schlee and Stout Speak

DETROIT, Nov. 12—Edward F. Schlee of "round the world" fame and W. A. Stout, head of the aviation division of Ford Motor Co., addressed the Detroit Section of Society of Automotive Engineer this week. The meeting was preceded by a dinner at the Book-Cadillac Hotel and was attended by 540 members and guests.

Mr. Schlee said the two features of his flight that remained uppermost in his memory were the weather conditions, which are much better in this country than anywhere abroad, and the superiority of American landing fields to those in European and other countries. In Mr. Schlee's opinion, for instance, the Croydon Airdrome near London cannot compare with the flying fields used in the 1927 National Air Tour.

Mr. Stout discussed the development of aviation and its place in the scheme of human development. He forecast that in 20 years private ownership of airplanes would be as common as that of automobiles at present.

Dr. R. E. Wilson Talks to Section

PHILADELPHIA, Nov. 16—At the November meeting of the Pennsylvania Section of the Society of Automotive Engineers, Dr. Robert E. Wilson, of the research council of the Standard Oil Co. of Indiana, spoke on recent developments in engine lubrication. The meeting was well attended and the talk by Dr. Wilson was followed by a prolonged discussion. At the meeting B. B. Bachman was elected the section's representative on the nominating committee of the parent society and E. W. Templin a member of its sections committee.

Gasoline Taxes Yield $101,250,841 in 1st Half

WASHINGTON, Nov. 12—Gasoline taxes the first six months of this year yielded a revenue of $101,250,841, an increase of 19.2 per cent over the same period of 1926, according to data supplied by the U. S. Bureau of Public Roads. In computing this tax, the Bureau figures that 4,919,000,000 gallons of gasoline were consumed by motor vehicles during this six months' period.

The 1927 consumption was 11.4 per cent more than that reported for the first six months of 1926, while the increase in motor vehicles registrations was 7 per cent.

Gasoline Output Lower

NEW YORK, Nov. 14—Production of gasoline in September, 1927, totaled 27,716,000 bbl., a slight decrease from the August figure of 28,010,000 bbl. but a gain over the September, 1926, figure of 25,360,000 bbl. Stocks during August decreased 3,717,000 bbl. to a total of 29,738,000. The indicated domestic consumption during the month of September was 28,409,000 bbl., compared with 29,779,000 in August and 22,929,000 in September, 1926.

Auburn Signs Crocker

DETROIT, Nov. 14—The Auburn Automobile Co. has appointed Crocker & Co. distributor for Uraguay, South America. The firm is located at Montevideo, and for 15 years has been representing one of the large motor car companies. The first Auburns there will be on display at the Montevideo show.

Financial Notes

Peerless Motor Car Corp. and subsidiaries report for the quarter ended Sept. 30 net income of $102,205 after depreciation and Federal taxes. This is equivalent to 39 cents a share earned on the 258,589 shares of $50 par value stock and compares with $247,306, or 96 cents a share, in the preceding quarter, and $239,191, or 92 cents a share, in the September quarter last year. The net income for the first nine months totaled $180,713, or 69 cents a share, against $1,139,330, or $4.40 a share in the first nine months of 1926.

Moon Motor Car Co. reports for the eight months ended Aug. 31 net loss of $20,002, after expenses and interest, but before operating and liquidating losses of subsidiary selling companies. After deducting $162,000 loss on operating and liquidating losses of subsidiaries the net loss totaled $182,003. The income account for the eight months showed net sales of $2,595,834 and gross profit of $315,200.

Stewart-Warner Speedometer Corp. and subsidiary companies report net income for the September quarter of $1,625,706 after all charges and Federal taxes. This is equivalent to $2.71 a share as against $2.81 a share in the 1926 quarter. Current assets total $14,368,585 against current liabilities of $1,605,826. Holdings of cash and marketable securities totaled $5,525,736.

American-La France Fire Engine Co., Inc., and subsidiaries as of June 30, 1927, shows total assets of $14,569,622, compared with $15,275,199 on Dec. 31, 1926, and profit and loss surplus $1,334,604 against $1,605,593. Current assets totaled $8,628,047 and current liabilities $631,180, as compared with $9,308,057 and $1,061,246, respectively, on Dec. 31, 1926.

Mullins Body Corp. directors have voted to change the name of the company to the Mullins Mfg. Corp. for business reasons and have filed application with the New York Stock Exchange to list the shares of the new concern. Capitalization will remain unchanged.

Briggs Mfg. Co. reports net profit for the first nine months of 1927 as $2,568,944 as against $6,772,799 in the same period last year. Loss of $464,337 was reported for the third quarter, against net profit of $1,359,068 in the third quarter of 1926.

Doehler Die Casting Co. reports a net profit of $353,397 after charges but before Federal taxes for the first nine months of 1927.

Chrysler Sales Higher in Rural Territories

DETROIT, Nov. 14—According to J. W. Frazer, sales manager of the Chrysler Corp., more than half of the 1000 new dealers who have joined the Chrysler forces in the last 11 weeks are located in towns of 10,000 population or less.

"Some of the figures in this year's expansion of Chrysler rural business are very impressive," said Mr. Frazer. "In May of this year sales to farmers showed an increase of 49.4 per cent over May, 1926. In June the increase was 99.2 per cent over June, 1926.

A.A.A. Fall Meeting to Open in Boston

BOSTON, Nov. 14—The annual fall meeting of the American Automobile Association will be held at the Hotel Statler, Friday, Dec. 2. President Thomas P. Henry, of Detroit announced a few days ago that as a tribute to what the New England motor clubs had done in the way of extending the policies of the American Automobile Association, that the meeting should be held here.

Directors of all the 17 New England automobile clubs are to be guests of the club. President Henry is expected to talk on the war tax elimination. Manager Ernest R. Smith is slated to discuss the Compulsory Insurance Law, and challenge the statement made by Insurance Commissioner Wesley Monk, of Massachusetts, at a conference some time ago in Baltimore, that the law is working 100 per cent. The Boston Automobile Club is seeking data to try to prove that the insurance companies are refusing to pay fair claims, and that imputing the decrease in accidents and fatalities to the law is erroneous, but due more to the safety work campaigns of the motor organizations.

Watson Doubles Capacity

PHILADELPHIA, Nov. 14—Construction has been started of the addition to the plant of the John Warren Watson Co. It will be 120 ft. wide by 950 ft. long and will afford 120,000 sq. ft. of additional floor space, more than doubling capacity of the present plant.

Van Dorn Opens in K.C.

KANSAS CITY, Nov. 16—The Van Dorn Electric Tool Co. of Cleveland, has opened a factory branch here at 1821 Wyandotte St. The manager is Milton A. Seibert. The branch also will serve as a service station for the Southwest, the shop being in charge of factory trained workmen.

Coming Feature Issues of Chilton Class Journal Publications

Feb. 18—Statistical Issue—Automotive Industries

Jan. 1—National Shows Number—Automobile Trade Journal.

Jan. 5—National Shows Issue—Motor Age.

Southern Railways Hear N.A.C.C. Traffic Managers

NEW YORK, Nov. 12—A special committee representing the traffic managers of the National Automobile Chamber of Commerce, this week presented before the freight classification committee of the southern railroads the position of the automotive industry in respect to the proposed 25 per cent increase in passenger car freight rates and the varied increases on parts that are contemplated. J. S. Marvin, secretary of the traffic managers committee, made the presentation. In addition to him, the committee included E. M. Hodges, Hupp, chairman; P. J. Findlay, Dodge; G. C. Conn., Buick; W. J. Bailey, Durant, and C. R. Scharff, Chevrolet.

California to Conserve Fuel

SACRAMENTO, CAL., Nov. 12—A state commission to study methods of conserving oil and natural gas resources of the state, and to present plans for control of production and elimination of waste by legislative action, is to be appointed soon by Governor C. C. Young, according to announcement by the executive himself. The California State Railroad Commission has just rendered a preliminary report on wastage of natural gas and oil to the governor, who is now making a study of the conclusions drawn from that investigation.

Flying Boom Waits Comfortable Planes

LOS ANGELES, Nov. 15—A. H. G. Fokker, inventor and manufacturer of airplanes, declared in an address during his visit here, that if the air-mail carriers will provide safe and comfortable transportation for passengers, particularly by the use of tri-engined planes which inspire public confidence, there is no doubt that commercial aviation will develop in the United States to a far greater degree than it has during the last few years in Europe.

Mr. Fokker said suitable commercial planes for the service he predicts soon will be in operation, already have been built and tested to show their trustworthiness and safety. He favors a 10-passenger three-engined plane with automatic stabilizing features which prevent stalling, nose dives and tail spins.

"The public is aware of the safety of commercial flying and will use air transportation to an increasing degree as soon as comfort is provided," added Mr. Fokker. "The present air-mail planes have room for only one or two passengers and there is no comfort. People would not use trains if they had to sit on the cow-catcher and for the same reason they will not use airplanes until comfort as well as safety is assured."

Starts Local Plane Service

OAKLAND, CAL., Nov. 12—Pacific-Atlantic Air Lines, Inc., has been organized, with headquarters here, to establish local passenger and express air transportation between Oakland and San Francisco and the interior cities and towns of northern and central California. The corporation is closed, with R. U. McIntosh, of this city, as the principal backer. The corporation has two planes at the Oakland municipal airport, and is having a seven-passenger plane built in San Francisco. Lines to Sacramento, Stockton, Fresno, Modesto and Redding are to be established first, according to McIntosh.

Calendar of Coming Events

SHOWS

All Western Road Show, Los Angeles, March 7-11
American Road Builders Association, Public Auditorium, Cleveland.Jan. 9-13
*Boston, Mechanics Bldg.....March 10-17
*Chicago, National Automobile Chamber of Commerce, Coliseum, Jan. 28-Feb. 4
International Aircraft Show, Berlin, March 23-April 11
Lille, France, Exposition....Nov. 20-Dec. 4
London Truck Show .....Nov. 17-26
Montevideo .....Nov. 19-27
*New York, National Automobile Chamber of Commerce, Grand Central Palace .....Jan. 7-14
Rio de Janeiro .....May 3-13
Salon, Automobile Salon, Inc., Hotel Drake, Chicago .....Jan. 28-Feb. 4
Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles .....Feb. 11-18
Salon, Automobile Salon, Inc., Hotel Commodore, New York..Nov. 27-Dec. 3
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco..Feb. 25-March 3
United States Good Roads Show, Des Moines .....May 28-June 1

*Will have special shop equipment exhibit.

CONVENTIONS

American Road Builders' Assn., Hotel Hollenden, Cleveland .....Jan. 9-13
American Road Builders' Association, Banquet, Hollenden Hotel, Cleveland .....Jan. 11
American Society of Mechanical Engineers, Annual Meeting, New York City .....Dec. 5-8
Automotive Equipment Association, Grand Hotel, Mackinac Island, June 10-16
National Foreign Trade Council, Houston, Texas .....April 25-27
National Research Council, Washington, D. C. .....Dec. 1-2
Overseas Automotive Club., Inc., Monthly Luncheon, Hotel Astor, New York .....Dec. 8
United States Good Roads Association and Bankhead National Highway Association, Des Moines.May 28-June 1

N. A. D. A.

Chicago, Jan. 31-Feb. 2—Annual, Palmer House.
Chicago, Feb. 1—Banquet, Palmer House.
New York, Jan. 9-10—Eastern District, Hotel Commodore.

S. A. E.

National

Chicago, Dec. 1—Tractor Meeting.
Detroit, Jan. 24-27—Annual Meeting.
European trip—Nov. 2-Dec. 12.
New York, Jan. 12—Annual Dinner.